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Railway Age

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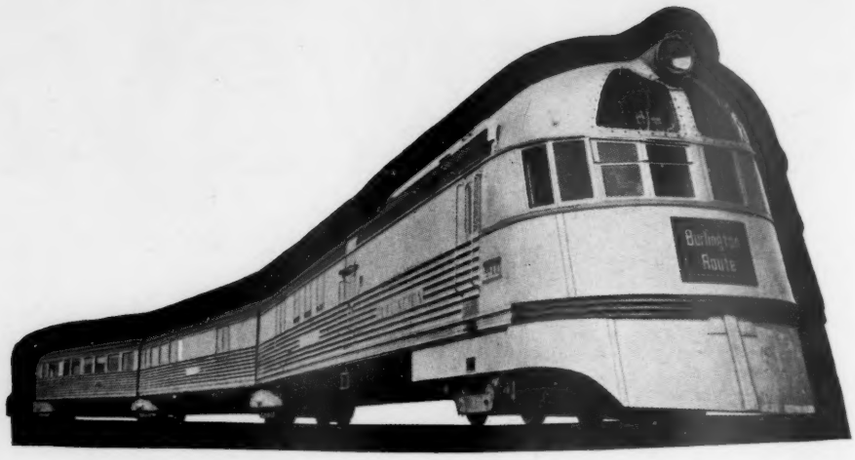

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Published weekly by Simmons-Boardman Publishing Company, 1309 Noble Street, Philadelphia, Pa. Entered as second class matter, January 4, 1933, at the Post Office at Philadelphia, Pa., under the Act of March 3, 1879.

Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name registered U. S. Patent Office.

Vol. 99 July 20, 1935 No. 3

Published every Saturday by the Simmons-Boardman Publishing Company, 1309 Noble Street, Philadelphia, Pa., with editorial and executive offices: 30 Church Street, New York, N. Y., and 105 West Adams Street, Chicago, Ill.

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The Railway Age is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

Subscriptions, including 52 regular weekly issues, payable in advance and postage free; United States and possessions, 1 year $6.00, 2 years $10.00; Canada, including duty, 1 year $8.00, 2 years $14.00; foreign countries, 1 year $8.00, 2 years $14.00.

Single copies, 25 cents each.

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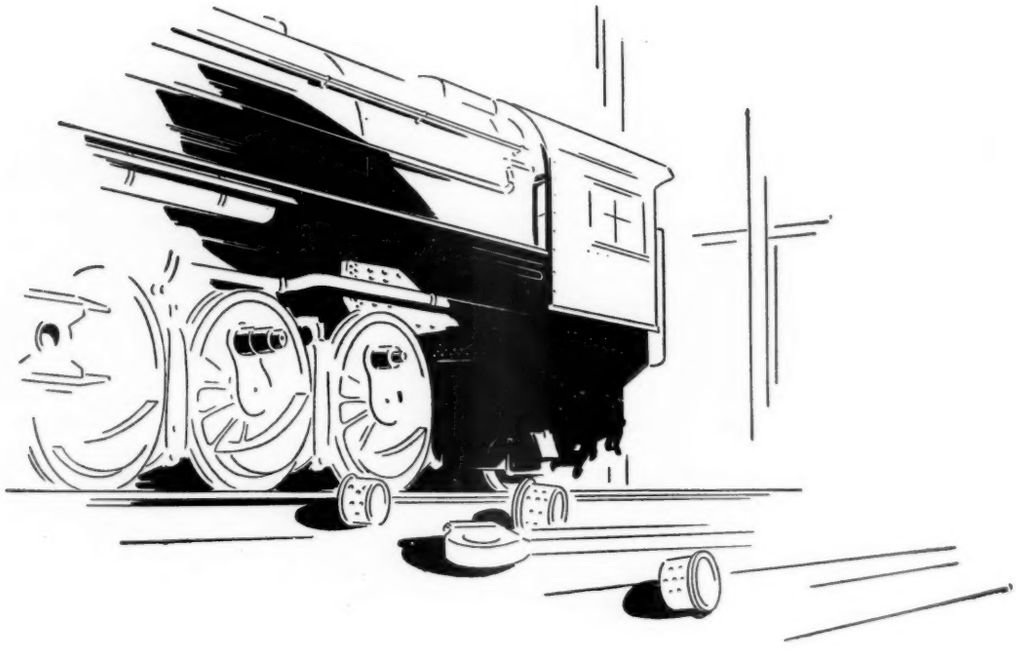
THIS LOCOMOTIVE NEEDS NEW RODS



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RAILWAY AGE

Some Current Lessons from the Railway Safety Record

Co-ordinator Eastman usually has been intelligent and fair in his comments upon railroad management, even when he has advocated policies opposed by the railroads, but he recently made a statement such as should not be allowed to go unchallenged. In an address before the Motor Truck Club at Boston on June 11 he said, "It is highly significant that in the history of the railroads practically every safety device required by governmental authority, and bitterly resisted in the beginning, such as the air brake and the automatic coupler, has ultimately operated to their very great benefit and advantage."

There is no part of their record of which the railroads are more justly proud than the increase in the safety of their operation. Mr. Eastman's statement could easily be construed as indicating that this achievement has been due principally to government policies which the railways have resisted. Railway labor leaders are now advocating congressional legislation to curtail freight trains and require employment of more trainmen, ostensibly to promote safety. They could use the Co-ordinator's assertion in their efforts to convince Congress that governmental coercion always has been and still is necessary to get the railways to do the things essential to reducing accidents, whereas nothing could be farther from the truth. Statistics given in an accompanying table show that throughout the last thirty years there has been a continuous increase in the safety of operation, with the result that, relatively, fatalities of employees have declined 79 per cent and of passengers 84 per cent. Only in very small measure has this reduction of accidents, which probably has not been equalled in any other industry in the world, been due to governmental action or policies.

Air Brakes and Automatic Couplers—Government or Private Initiative?

What are the facts regarding the matter to which Mr. Eastman specifically referred—adoption of the air brake and automatic coupler? The first governmental requirement of air brakes and automatic couplers was made in the Safety Appliance Acts of 1893. The Westinghouse Air Brake Company had begun manufacturing such brakes in 1870; and the Interstate Commerce Commission, in its annual report for 1889, said, "In this country the use of automatic air brakes, continuous through the train and operated principally from the engine, is almost universal upon passenger cars." This could not have been said of any government-operated system of railways. It could be said only of American railways. The use of air brakes on freight trains was retarded by a number of causes. Among these were that freight cars, unlike passenger cars, were interchanged between all the railroads, and that the same equipment which would control shorter and lighter passenger trains was not effective or safe on long, heavy freight trains. The important and difficult task of developing uniform air braking systems for freight trains was voluntarily undertaken by a railroad organization, the Master Car Builders' Association. Of its work the Commission said in its report for 1889, "The outcome of these experiments and of the improvements resulting from them has been a high degree of efficiency. * * * It is by no means a fact that railroad officers as a class are indifferent to humane considerations, and much of this sort that is said is wholly unjust." In 1893, when the Safety Appliance Acts were passed, almost 76 per cent of freight locomotives and 19 per cent of freight cars were equipped with air brakes.

Developments as respects automatic couplers were much the same. They were originated by American manufacturers, and the report of the Commission for 1894 shows that 97 per cent of passenger cars were equipped with them when the Safety Appliance Acts were passed. As to freight cars, as early as 1887 the Master Car Builders' Association submitted to all the railroads a type of coupler covering a variety of patented couplers which would couple with each other, and it was adopted by letter ballot. Some of the railways could not accept this type because of conflicting state laws. As in the case of air brakes, the federal Safety Appliance Acts hastened the adoption of uniform standards for automatic couplers, but they had been developed voluntarily by the railroads of the United States through the Master Car Builders' Association.

There is, therefore, no basis for Mr. Eastman's as-

sertion that the railroads "bitterly resisted" the adoption of air brakes and automatic couplers, or his implication that the railroads did not appreciate the "very great benefit and advantage" they would derive from them. Facts of somewhat similar significance could be cited regarding the parts played by railroad managements and government in effecting other improvements in plant which have contributed toward reduction of accidents.

The Railway "Safety First" Crusade

Of much more importance, however, is the fact, which is known to every student of the subject, that much the greater part of the reduction of railway accidents has not been due to improvements of plant, as great and important as they have been, but to improvements in the morale and methods of railway officers and employees to which government has contributed nothing. Some twenty years ago, when more persons were being killed and injured on the railways than ever before or since, analysis of accident statistics demonstrated that 92 per cent of all fatalities occurring on the rails were due to "man failures," and that if the physical plant had been perfect 92 per cent of those killed would have been killed anyway. The phenomenal subsequent reduction of accidents has vindicated the conclusion then expressed; and it is given collateral support by the constantly increasing slaughter upon the highways. While during the last decade vast expenditures to improve both motor vehicles and highways have been made, they have been accompanied by a constant increase in the number of fatalities and injuries occurring upon the highways. This has been due to the increasing speed and recklessness with which highway vehicles have been driven, especially upon rural roads, and to a consequent great increase in "man failures."

In the summer of 1910 division officers and employees of the Chicago & North Western held the first railroad "safety first" meeting at Baraboo, Wisconsin, and a "safety first" committee of officers and employees was formed to educate both officers and employees regarding the causes of "man failures" and the means of preventing them. This beginning of the railway "safety first" crusade was fully reported by the *Railway Age* at the time, and, largely because of publicity given to it in this paper, it spread rapidly over railways throughout the country. It has been continued ever since, and will have to be continued always if the safety record is to continue to improve, or even to be maintained.

This is called the "machine age," and prevalence of a childish belief that machinery will almost run itself is responsible for the prevalence also of many social and economic theories which disregard the vitally important factors of superior ability and human nature in the conduct of all practical affairs. Human nature has not changed on the railways or elsewhere. The natural tendency of most persons to be careless and inefficient would soon cause the railway accident record to become as bad as formerly if "safety first" methods and practices were not constantly taught and enforced by railway officers and the more intelligent employees.

Train Lengths Increase—Accidents Decline

The statistics given in the accompanying table well deserve study. They have been compiled for five-year periods to eliminate fluctuations caused by unusual conditions in single years. The claim is made by railway labor union leaders, in their advocacy of train limit and "full crew" legislation, that increase in the length of trains, and especially of freight trains, increases the hazards of operation. The statistics show that in every five-year period for thirty-five years there has been an increase in the average number of cars per freight train. They also show that it has been accompanied by an increase in every five-year period in the number of employees in general, and of trainmen in particular, in proportion to the number killed, and also in the number of passengers carried in proportion to the number killed. Within the last decade increase in the length of freight trains has been accompanied by unprecedented increase in their speed. In the five years 1930-1934 the average number of cars per freight train was 14 per cent greater, and the average speed of freight trains 36 per cent greater, than in the five years 1920-1924. The cumulative effect on safety of the improvements made in equipment, operating methods and morale of employees over a long period of years is clearly indicated by the statistics. The half-decade ending with 1934, when the average length and speed of trains greatly increased, was a period of depression during which little new equipment was bought and expenditures for maintenance were greatly reduced. Nevertheless, the average number of all employees killed annually in proportion to the number employed was 44 per cent smaller than in the half-decade ending with 1924; the number of trainmen killed annually, 46 per cent smaller in proportion to the number employed; and the number of passengers killed annually, 54 per cent smaller in proportion to the number carried. Such facts certainly do not indicate that curtailment of the length of trains or increase in the number of employees on them is needed to promote safety. Legislation for these purposes obviously is not advocated to promote safety. It would increase the number of trains and employees required

Thirty-Five Years' Improvement in Railway Accident Record

Five years ended with	Average number employees in service per employee killed	Average number trainmen in service per trainman killed	Average number passengers carried per passenger killed	Average revenue tons per train	Average cars per freight train
1904	384	130	1,987,000	293	*26.6
1909	433	147	2,178,000	348	27.9
1914	494	204	3,557,000	424	31.1
1919	674	280	4,018,000	580	36.3
1924	1,012	403	5,836,000	626	39.1
1929	1,163	501	7,216,000	705	46.4
1934	1,821	743	12,582,000	648	46.6

* Four year average.

to handle any given amount of traffic, and, thereby, the hazards of operation.

Railway Safety an Achievement of Private Enterprise

As it is now the vogue among a certain class of persons to assume and contend that government interference and action are necessary to promote every good cause, economic, social or otherwise, it may be worth while to recall that the initiative in inventing, developing and promoting every means and method, physical and otherwise, by which safety in railway operation has been increased has been taken by private enterprise. In several instances legislation has hastened the general and uniform adoption of improvements in railway plant, but such improvements always have been originated by railway managements or manufacturers of equipment and supplies, and the constant advance in the art of transportation by rail in this country has been due to co-operation by railway managements and railway equipment and supply manufacturers.

Patents

Is a device to be condemned or discriminated against because it is patented? Is the monopoly which it creates detrimental to the railways? These questions are raised, by inference at least, in a report which Co-ordinator Eastman has just issued outlining studies which his staff has made of possible technical improvements in railway equipment, an abstract of which is published on a following page. In this report there is incorporated an extended discussion of patents and their effect on the railways, in which references to monopolies fostered by patents, suggestions for cross licensing and for the manufacture of repair parts in railroad shops, etc., indicate a feeling that patents constitute a burden on the railways. This is a viewpoint which warrants careful consideration.

Taken by itself, the granting of a patent gives to the holder thereof a monopoly on the production of the product patented. Examples can be cited where manufacturers have taken advantage of patents to exact high prices. Likewise, examples can be cited where users have taken undue advantage of patentees. In studying this subject, one should not lose sight of the fact that the railway purchaser is always free to refuse to pay the price asked for a patented material or device.

The monopoly granted by a patent involves a principle long recognized to encourage inventive and commercial initiative. That the protection thus afforded has been productive of much, if not most, of the progress in American industry is recognized generally. It has been especially valuable to the railways because most of the technical progress they have made has been originated by supply companies that have not only fostered and encouraged inventors, but have perfected their devices and brought them to commercial production. Through these means the supply companies have contributed to technical progress of the railways to a degree that is not commonly recognized and appreciated. Furthermore, they have made a contribution which the railways themselves have not been prepared to make.

To limit the benefits of such work through means for the control of patents, through compulsory cross licensing, etc., may bring temporary benefits, to the railways in the way of lower prices, but the ultimate effect will be to lessen initiative for further development to an extent that cannot but result adversely to railway progress in the future. What the railways need today is more experimentation and more development, not less.

* * * *

A Wabash Fast Freight near Halstead Street, Chicago

Railway Supply Officers Convening to Discuss Problems

Large gathering to attend first annual convention in three years—Railway executives send messages

PROBLEMS confronting the railroads of the United States and Canada in purchasing, handling, distributing and accounting for the materials and supplies required for the operation, maintenance and improvement of the railroads, and what the purchasing and stores organizations have been doing or propose to do with them, promise to be the subjects of a busy two-day discussion in Chicago on July 23 and 24 when Division VI, Purchases and Stores, A. A. R., will hold the first annual meeting for its entire membership in three years and incidentally the first meeting which the membership has held as a part of the division of maintenance and operation of the recently-formed Association of American Railroads. Such gatherings as have been held since 1932 have been restricted to meetings of the General committee and the chairmen of subject and special committees. The meetings next week will be presided over by Chairman G. E. Scott, assisted by C. B. Tobey, vice-chairman, and W. J. Farrell, secretary.

Convention Program

Tuesday, July 23, 10:00 A. M., Daylight Saving Time

Report of General Committee

Address by Chairman George E. Scott

Report—Standard Material Classification

Report—Classification, Handling and Sale of Scrap

Report—General Reclamation

Report—Comparisons of Material Stock Reports and Material Store Expenses. Joint Committees on Material Store Expenses

Report—Forest Products

Report—Control of Purchased and Shop-Manufactured Stocks and Co-ordinating Procurement with Actual Needs

Report—Pricing and Inventory

Report—Purchasing Agents' Organization, Practices and Office Records

Report—Stationery and Printing

Report—Stores Department Fire Prevention

Wednesday, July 24, 9:30 A. M., Daylight Saving Time

Report—Simplification and Standardization of Stores Stocks

Report—Stores Department Safety Practices
Presentation of annual contest papers

Report—Purchasing, Storage and Distribution of Equipment and Supplies Used in Dining Cars, Hotels and Commissaries

Report—New Ideas and Economies

Report—Purchase of Special Devices and Commodity Purchases

Report—Exchange of Surplus Material

Report—Material Guarantees—General Practice as to Guarantees —Failures, Methods of Handling

Report—Stores Department Buildings and Facilities for Economical Handling of Materials

Among railway purchasing and stores officers, much importance is attached to the convention because of many developments which have occurred in the railroads and business generally which are demanding group consideration and because the Division has been authorized to deal more effectively and with greater finality than in the past in co-ordinating supply practices of individual railroads as well as to act for the railroads in formulating and arbitrating trade policies with industries. With these apparently increased powers over the activities of individual railroads, the question of railway representation in the Division has also risen to stimulate interest in the coming meeting, especially because of the fact that expirations of the terms of office of an unusually large proportion of the directing committees will leave many vacancies to be filled.

While it has been three years since the last national gathering of purchasing and stores officers, the period is regarded in the association as the most active and important in its history. Almost every measure taken by the federal and state governments to reform or restore business has altered or complicated railway supply work in one or more particulars because of the great variety of materials purchased and the diversity of terms and conditions under which they are obtained and handled.

It has particularly devolved upon the Division to co-operate with the federal co-ordinator in the investigations of purchases and stores methods made by the co-ordinator's Section of Purchases, and to study the suggestions contained in the reports which have been issued from time to time, while the code work has also required and continues to occupy a prominent place in the association's deliberations. Purchasing officers active in the Division composed the original committee appointed by the railway executives in 1933 to negotiate revisions in adopted codes, and in January, 1934, the Division was empowered to appoint committees to deal with the objectionable features of the codes being formulated, affecting coal, oil, steel, lumber, ties and 50 or more other classes of materials. The work performed by these committees has been regarded so beneficial that arrangements were recently made to continue the type of work that has been performed by the code committees.

Early in 1933, it became apparent that while subject committees continued to function in their investigations of assigned topics, a more intimate knowledge of common problems of the purchasing officers was a necessity. This led to the establishment of group purchasing and, later, group stores committees in several sections of the country, and the work of these group committees has since been co-ordinated with the work of the subject committees of the Purchases and Stores Division by rearranging the personnel of the subject committees to include members familiar with the work of each group. Subject committees of the association have also been reduced to seven members. Heretofore, the adoption of the recommendations of the Division by the member railroads has been purely discretionary, but, recently, the Division has adopted the practice of subjecting all important subjects to a letter ballot vote in which the members will indicate whether recommendations shall be made mandatory, in addition to voting whether to adopt the recommendations, and when the results of

letter ballots favor mandatory action the subjects in question with all data will then be submitted to the vice-president, operations, Association of American railroads, for final disposition.

Executives Spur Committee Work

In special statements to *Railway Age*, chief executives of railroads all over the country have expressed their interest in the coming convention and added the weight of their opinion to the importance of the work and the possibilities for the railroads to be obtained by the constructive consideration of the supply problems confronting the railroads. These messages are in part as follows:

With the formation of the Association of American Railroads, all the divisions of the Association will have to assume increased responsibilities in helping to solve the many problems confronting the railroads, and the Purchases and Stores Division will have an opportunity of doing constructive work in this direction. The meeting in Chicago should be productive of good results to all members of the Division.

F. E. WILLIAMSON, President,
New York Central System.

In these days of great necessity for economies, I think the work of the purchasing and stores officers on all the railroads has been of immeasurable benefit in helping to solve the difficult problems that have beset management. They have played a very important part in co-operating and meeting the emergencies that have arisen the last four or five years in the transportation world, and I send them my sincere good wishes that their meeting will be a success, and appreciation of the fine work they are doing.

W. P. KENNEY, President,
Great Northern.

It is gratifying to feel that conditions have so improved that the Association of American Railroads has decided to hold a convention of the purchases and stores officers on July 23 and 24. It will be impossible to estimate how much good has been done and how much money saved the railroads of the country by the work of purchases and stores officers during the last ten years. With entirely new conditions to face, many economies have been put into effect which in the aggregate have helped greatly toward bringing us through the depression and we certainly want to congratulate them for their faithful and efficient service during the discouraging years.

PERCY R. TODD, President,
Bangor & Aroostook.

Please extend my greetings and best wishes to the purchases and stores officers and guests for a very successful meeting. The convention offers many advantages and, through actual discussion and liberal exchange of ideas, many benefits will result.

C. T. O'NEAL, President,
Chicago & Eastern Illinois.

Permit me to congratulate the purchases and stores officers on the results they have accomplished, especially during the past few years, in reducing the amount of money invested in materials and supplies and in keeping expenditures down to a minimum, thereby helping to make it possible for the railroads to carry on during this difficult period. They have labored under trying conditions and now that the tide is turning I feel sure that they will continue to do their part as faithfully as in the past.

DANIEL UPTHEGROVE, President,
St. Louis Southwestern.

I extend hearty good wishes to the many railways' purchasing and stores officers attending the convention on July 23 and 24. Occupying as they do a most important position in railway organization, we are cognizant of and sympathetic with the many problems they have faced during the recent trying years when the income of their railroads in many instances was not sufficient to supply funds for the purchase of necessary things to keep the line in running order. I sincerely hope that the broader responsibilities to be assumed by the Purchases and Stores Division of the Association of American Railroads will result in mutual benefits to all of us.

FITZGERALD HALL, President,
Nashville, Chattanooga & St. Louis.

I desire to extend my best wishes to those attending the Purchases and Stores Division, A. A. R., in Chicago on the 23rd and 24th, and hope that the session may be one of constructive effort in accomplishment.

J. B. HILL, President,
Louisville & Nashville.

I desire to extend through *Railway Age* a greeting to the officers and members of the Purchases and Stores Division of the Association of American Railroads and to assure them that the executives of American railroads appreciate the splendid efforts toward economy that have been made by that organization.

A. N. WILLIAMS, President and General Manager,
Chicago & Western Indiana.

The Santa Fe extends the Purchases and Stores Division of the Association of American Railroads best wishes for an enjoyable and profitable convention. The work which it is doing is of fundamental importance to successful railway operation.

S. T. BLEDSOE, President,
Atchison, Topeka & Santa Fe.

The time is appropriate for a comparison of ideas and a discussion of plans for the future, and I express the earnest hope that the deliberations of the Purchases and Stores Division will be of benefit to the railroad industry as a whole.

J. E. GORMAN, Trustee,
Chicago, Rock Island & Pacific.

There are many important problems with which the members of the Purchases and Stores Division must deal and there are many opportunities, perhaps some yet unexplored, for economy and efficiency in purchases and stores for the railroads of this country. Problems of the division have been reviewed by the staff of the Federal Co-ordinator of Transportation and suggestions have been made for changes and possible improvements in methods and practices. I hope the Division will give these suggestions careful consideration as they may deserve and will carry from the meetings new and profitable ideas.

M. J. GORMLEY, Executive Assistant,
Association of American Railroads.

It is a pleasure to extend greetings to the purchases and stores officers of the railroads who gather at their convention in Chicago on July 23 and 24. The co-operative action of the purchases and stores forces through the various committees of Division VI, A. A. R., has been quite helpful to the railroads in standardizing practices and methods, and it is hoped that the good work will continue.

H. S. PALMER, President,
New York, New Haven & Hartford.

As a railroad man interested in the progress of industry as a whole, I am pleased to see the resumption of meetings by the purchases and stores officers of the railroads. On the one hand, this action means increased efficiency and co-ordination in railway buying and storing, with consequent economy to railroads directly, and to their patrons indirectly. On the other hand, we all fervently hope that the meeting to be held on July 23 and 24 presages an early return of the railroads to their rightful position as unparalleled consumers. When that is accomplished, there will be no further question about the return of national prosperity.

L. A. DOWNS, President,
Illinois Central.

In sending greetings to the delegates and guests of the Purchases and Stores Division, it is my sincere hope and belief that the assumption of added responsibilities by the Division will furnish additional opportunities for the development and execution of methods to increase the purchasing power of the railway material dollar.

A. C. NEEDLES, President,
Norfolk & Western.

On the occasion of the convention of the Purchases and Stores Division of the A. A. R., I wish to extend my sincere greetings and best wishes to all the delegates for a most successful meeting.

Also, I congratulate the *Railway Age* on the splendid job done in this important field of work. It is during this period that so many ideas have been advanced, which have resulted in the better and more economical handling of our materials and supplies, and I think I express the sentiment of railroad men

(*Continued on page 78*)

$300,000,000 of Railway Supplies Since January

Large volume of buying despite poor earnings and legislative uncertainties—Rains increasing requirements

THE *Railway Age* has made an analysis which throws light on recent trends in railway buying. Although positive information is lacking on the situation in June, railway purchasing during the first six months of the present year appears to have reached a total of approximately $315,000,000. In this total are the estimated value of orders placed for new locomotives and cars, the estimated value of materials received from manufacturers during the period and the expenditures for fuel. The total purchases are less than the corresponding purchases in 1934, although well above the corresponding total for 1933 when purchases from manufacturers during the same months totaled approximately $100,000,000, and the purchases, including fuel, were approximately $175,000,000. Construction projects are not included in these figures except where the materials were furnished by the railroads.

Estimates of expenditures for materials for the first four months are based on reports received from 81 roads and subsidiaries operating 200,000 miles of road, while those for May are based on the reports which have been received at the time this was written from 33 roads operating 65,000 miles of line. From January 1 to June, the figures show, purchases of fuel and materials and supplies, exclusive of new rolling stock, totaled approximately $245,500,000, as compared with approximately $271,950,000 for the same period of 1934 and $155,600,000 in 1933. Disregarding coal and fuel oil, the expenditures, representing for the most part, purchases from manufacturers, were approximately $144,050,000, as compared with $178,120,000 in 1934 and $87,650,000 in 1933. As nearly as can be determined at this time, the value of new rail received up to June 1, including rail that was ordered last November and December, totaled approximately $7,500,000, as compared with $19,740,000 in 1934 during the same period, while payments for crossties up to June totaled $17,065,000 as compared with $15,000,000 in 1934 and approximately $10,380,000 for the same period of 1933. The preliminary figures place fuel purchases up to June at approximately $100,450,000, compared with $93,830,000 for the same period of 1934. Values include freight charges required to bring the materials to the line of road.

Since January, the railroads have ordered 18 new locomotives, 6,337 freight cars and 58 passenger cars to cost in the aggregate approximately $17,000,000, while the orders placed for new rail, including rail ordered in November and December, 1934, called for 325,871 tons for 45 roads and an undisclosed tonnage for 12 additional roads. This was a larger volume of equipment and rail than was ordered in 1933, but a much smaller quantity than was placed during the first six months of 1934, when the railroads were urged by the Government to participate in a large rail-buying program to stimulate industrial employment and when much of all the equipment and rail purchased was financed with P.W.A. loans. Orders placed for rail from November, 1933, to June, 1934, for example, were approximately 720,000 tons.

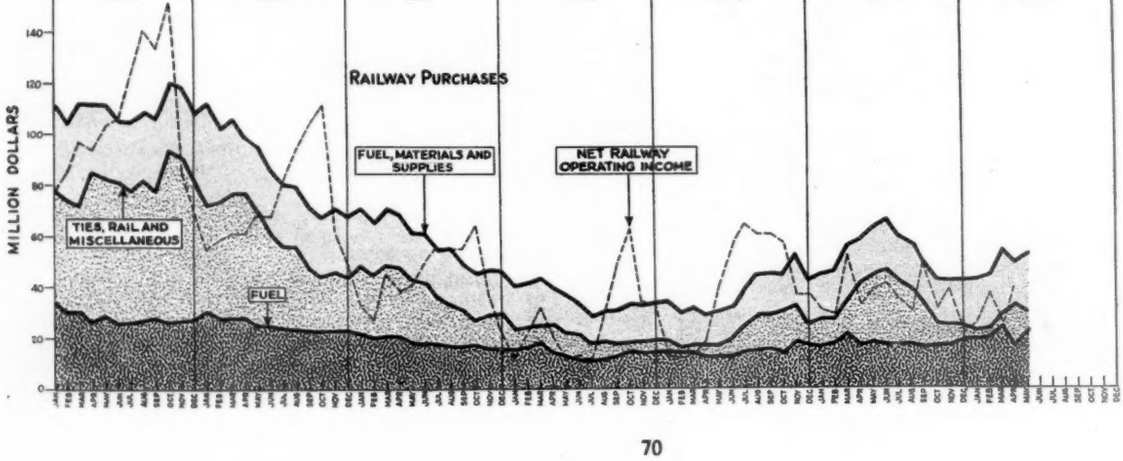
Railway Purchases *

1935	Fuel (000)	Cross Ties (000)	Other Material (000)	Total (000)	Total, Less Fuel (000)
January	$19,900	$2,220	$20,980	$43,100	$23,200
February	20,400	2,550	21,250	44,200	23,800
March	24,750	3,375	26,075	54,200	29,450
April	15,700	4,420	28,380	48,500	32,800
May	19,700	4,500	30,300	54,500	34,800
Five months	100,450	$17,065	$126,985	$244,500	$144,050
1934					
January	$17,630	$2,100	$25,870	$45,600	$27,970
February	18,700	2,550	25,000	46,250	27,550
March	22,100	3,000	32,400	57,500	35,400
April	17,200	3,400	38,500	59,100	41,900
May	18,200	3,960	41,340	63,500	45,300
Five months	$93,830	$15,010	$163,110	$271,950	$178,120

* Subject to revision.

More Tie Buying

While in the absence of P.W.A. loans and in the face of disappointing revenues earlier in the year, the total



Trend of Railway Buying by Months

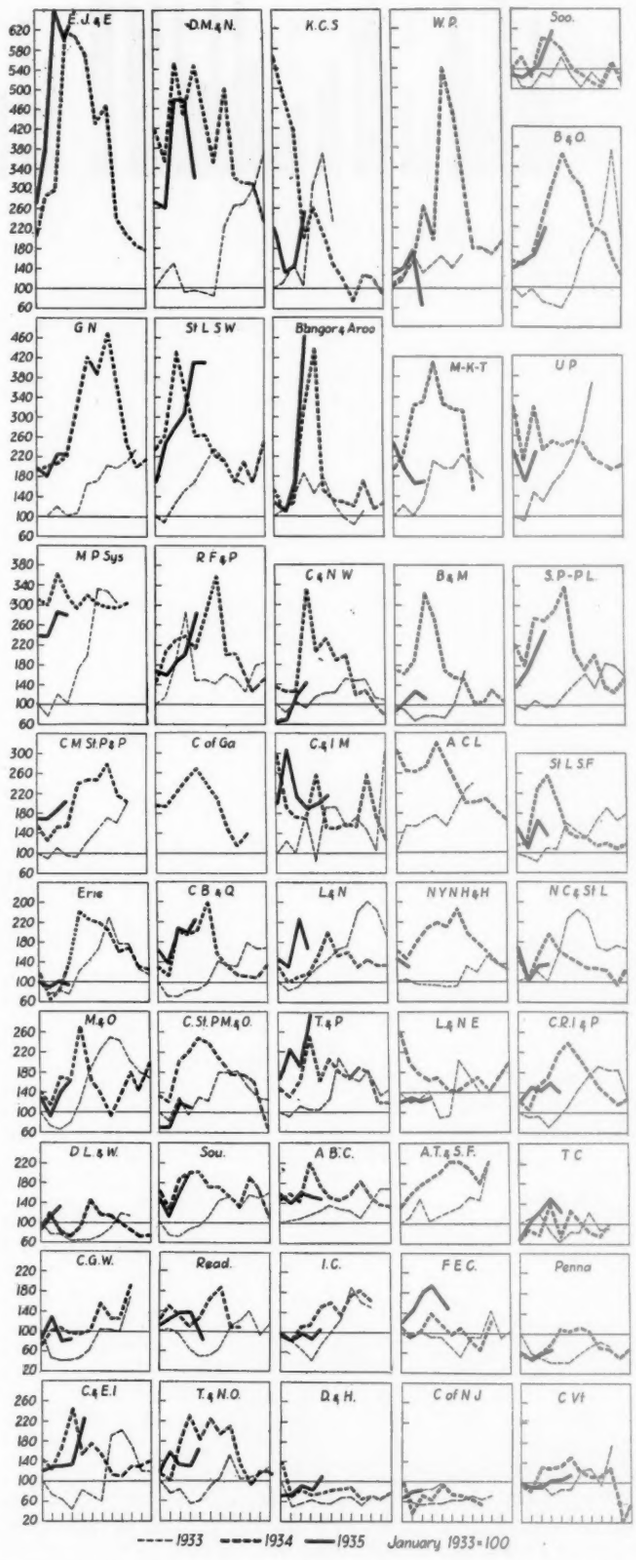
volume of purchases of materials and supplies was generally smaller each month of this year than the volume last year, the monthly totals increased from January to April, and the total in May, amounting to $54,500,000, was approximately $11,400,000, or 25 per cent, higher than in January, and the total purchases from manufacturers in May, amounting to approximately $34,800,000, were almost $12,000,000 higher than the corresponding expenditures in January. Purchases of crossties were larger every month this year than in 1934 or many previous years, and the same is true of fuel, although in the latter case the increased expenditures are attributed largely to substantial increases in the prices which the railroads were required to pay for coal under the coal code.

While the volume of buying during the first six months of 1935 was somewhat less in the aggregate for materials and supplies than in the previous year, except in the case of crossties, the general situation was not without important exceptions. Out of 60 roads for which comparative statistics are available, there are 30 whose expenditures since January for fuel and supplies were larger than were the corresponding expenditures in 1934. The expenditures for fuel and supplies increased $2,700,-

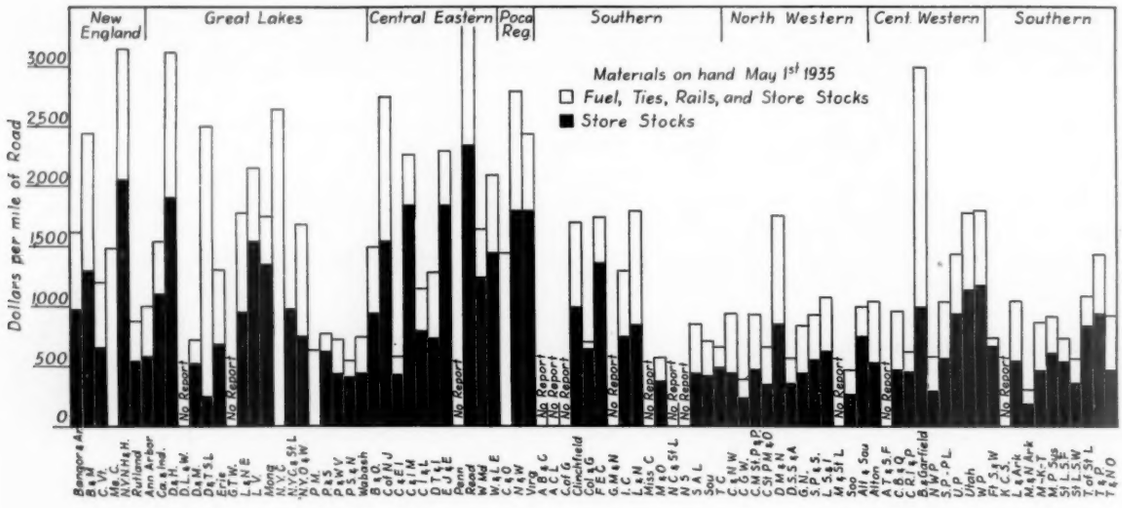
Purchases of Fuel, Materials and Supplies—First Four Months

	1935	1934	1933
Alton	$853,766	$.....	$560,672
Alton & Southern	52,028	.....	.....
Ann Arbor	283,454	236,852	169,308
Atchison, Topeka & Santa Fe	10,220,677	7,571,949	6,011,175
Atlanta, Birmingham & Coast	266,520	251,686	155,367
Baltimore & Ohio	6,753,921	6,045,501	2,965,144
Bangor & Aroostook	588,586	513,742	343,070
Bingham & Garfield	39,793	.....	.....
Boston & Maine	2,470,208	4,160,364	1,788,032
Cambria & Indiana	40,726	.....	.....
Central of New Jersey	1,558,033	1,511,728	1,344,274
Central Vermont	408,846	402,642	308,005
Chesapeake & Ohio	4,289,314	3,473,691	2,628,111
Chicago & Eastern Illinois	649,790	882,411	430,418
Chicago & Illinois Midland	186,878	174,599	135,839
Chicago & North Western	3,992,742	5,933,136	3,408,941
Chicago, Burlington & Quincy	4,984,855	5,096,936	3,394,152
Chicago Great Western	1,009,907	955,664	855,028
Chicago, Indianapolis & Louisville	377,411	.....	.....
Chicago, Mil., St. P. & Pacific	5,897,841	4,671,080	3,674,146
Chicago, Rock Island & Pacific	4,081,422	3,681,460	2,459,184
Chicago, St. P., Minn. & Omaha	1,042,918	1,080,973	920,343
Clinchfield	361,409	333,073	.....
Columbus & Greenville	72,661	77,315	43,159
Delaware & Hudson	1,865,866	2,114,097	1,389,421
Delaware, Lackawanna & Western	3,191,230†	2,547,823	2,107,265
Detroit & Mackinac	55,401	.....	.....
Detroit & Toledo Shore Line	140,689†	.....	.....
Duluth, Missabe & Northern	347,394	377,999	125,890
Duluth, South Shore & Atlantic	167,458	157,820	98,654
Elgin, Joliet & Eastern	561,066	483,046	219,742
Erie	3,547,607	3,836,502	2,443,250
Florida East Coast	615,624	429,863	372,894
Fort Smith & Western	34,212	49,827	.....
Great Northern	3,720,429	3,535,198	2,304,537
Illinois Central	5,475,964	5,327,473	3,748,782
Kansas City Southern	537,025	786,569	336,345
Lake Superior & Ishpeming	29,000	39,121	9,086
Lehigh & New England	179,081	297,888	128,772
Lehigh Valley	2,926,723	.....	.....
Louisiana & Arkansas	388,090†	194,670	120,187
Louisville & Nashville	4,518,625	3,504,821	2,193,388
Maine Central	905,921	933,436	566,169
Minneapolis, St. P. & Sault Ste. Marie	1,427,055	1,559,199	1,160,310
Missouri-Kansas-Texas	1,175,396	1,713,075	717,544
Missouri Pacific	6,268,396	6,842,210	2,951,855
Mobile & Ohio	485,833	509,723	330,844
Monongahela	149,213	.....	.....
Nashville, Chat. & St. Louis	948,973	960,956	730,561
Nevada Northern	37,348	.....	.....
New York Central Lines	19,064,296	17,402,497	12,355,869
New York, Chicago & St. Louis	1,560,506	1,546,704	1,152,718
New York, New Haven & Hartford	3,535,665	3,990,990	1,800,233*
New York, Ontario & Western	585,784	.....	.....
Northwestern Pacific	108,802	109,530	116,278
Pennsylvania and Long Island	16,855,319	17,482,340	11,517,034
Penn.-Read. S. S. Lines	127,354	.....	.....
Peoria & Pekin Union	107,502	.....	.....
Pere Marquette	1,729,755	1,548,327	1,136,288
Pittsburg & Shawmut	40,236	39,688	30,433
Pittsburg, Shawmut & Northern	51,442	111,508	31,473
Reading	2,723,628	2,820,449	1,981,242
Richmond, Fred. & Potomac	499,369	435,448	434,002
Rutland	214,085	.....	172,682
St. Louis-San Francisco	3,270,192	3,701,738	2,257,612
St. Louis Southwestern	628,140	440,700	278,167
Seaboard Air Line	2,286,049†	3,434,819	.....
Southern	6,273,394	5,957,552	2,849,092
Southern Pacific	6,366,954	7,210,255	3,440,182
Spokane, Portland & Seattle	350,145	.....	.....
Tennessee Central	140,071	154,218	110,892
Terminal of St. Louis	427,604	.....	.....
Texas & New Orleans	1,670,290	1,647,792	862,982
Texas & Pacific	1,393,509	1,139,282	709,272
Union Pacific	7,621,518†	7,446,370	5,253,689
Utah	40,659	20,431	28,207
Virginian	598,605	527,015	.....
Wabash	2,062,001	2,344,794	1,285,360
Western Pacific	953,750	628,000	585,600
Wheeling & Lake Erie	1,203,179	884,409	270,171

* Excluding freight.
† April estimated.



Charts Showing the Comparative Trend of Purchases of Materials and Supplies, Exclusive of Fuel, Rail and Ties, on Representative Roads since January, 1933



How Railroad Stores Vary on Mileage Basis

000, or 25 per cent, on the Santa Fe; approximately $700,000, or 10 per cent, on the B. & O.; approximately $700,000, or 19 per cent, on the C. & O.; approximately $1,100,000, or 20 per cent, on the Milwaukee; approximately $400,000, or 10 per cent, on the Rock Island; approximately $200,000, or 5 per cent, on the G. N.; approximately $115,000, or 2 per cent, on the I. C.; approximately $1,000,000, or 21 per cent, on the L. & N.; approximately $3,500,000, or 9 per cent, on the N. Y. C. lines; approximately $150,000 on the P. M.; $170,000 on the St. L. Sw., $300,000 on the Southern, $200,000 on the T. & P., and $300,000 on the W. & L. E. The increases in many cases are so large as to indicate that complete figures regarding the purchases of all the railroads during the entire six months of 1935 may show as large an outlay for fuel and materials and supplies as in the six months of 1934.

Orders for New Equipment and Rail—First Six Months, 1935 *

	Locomotives	Freight Cars	Passenger Cars	Rails† Tons
A. C. & Y.	..	....	..	7,600
Aliquippa & Sou.	1	....	..	.....
A. C. L.	..	....	..	5,000
A. T. & S. F.	..	....	..	25,883
Bang. & Aroos.	2	2	..	1,000
Belt	2	....	..	250
Bing. & Gar.	..	....	..	500
B. & M.	..	....	..	200
C. of Ga.	..	....	..	3,800
C. & O.	..	5,130	..	.....
C. & E. I.	..	....	..	4,800
C. & I. M.	..	....	..	100
C. & N. W.	..	....	..	25,000
C. & W. I.	1	....	..	500
C. B. & Q.	1	505	1	16,000
C. G. W.	..	....	..	5,000
C. I. & L.	..	....	..	500
C. St. P. M. & O.	..	....	..	1,000
D. & H.	..	....	..	3,000
D. L. & W.	..	....	..	4,000
D. T. & I.	..	....	..	2,500
Erie	..	....	55	16,880
G. M. & N.	..	....	..	3,218
G. T. W.	..	....	..	8,450
I. C.	..	....	..	100
I. G. N.	..	....	..	2,500
K. C. S.	..	....	..	2,000
L. & A.	..	....	..	1,870
L. & N.	..	....	..	15,000
M. P.	..	....	..	4,250
N. & W.	..	....	..	32,000
N. P.	..	....	..	10,000
N. Y. C.	..	....	..	20,000
N. S.	..	....	2	.....
N. T. & M.	..	....	..	600
P. M.	..	....	..	1,446
St. L., B. & Mex.	..	....	..	1,550
St. L.-San Fran.	..	700	..	15,000
S. A. L.	3	....	..	.....
Southern	..	....	..	16,000
S. P.	..	....	..	26,174
T. & P.	..	....	..	7,700
U. P.	..	....	..	19,500
Virginian	..	....	..	2,200
Wabash	..	....	..	5,000
W. Md.	..	....	..	2,000
W. P.	..	....	..	3,000
W. Ry. of Ala.	..	....	..	600
W. & L. E.	8	....	..	2,200

* Subject to revision.
† Including Nov. and Dec. figures.

Rains Increase Purchases

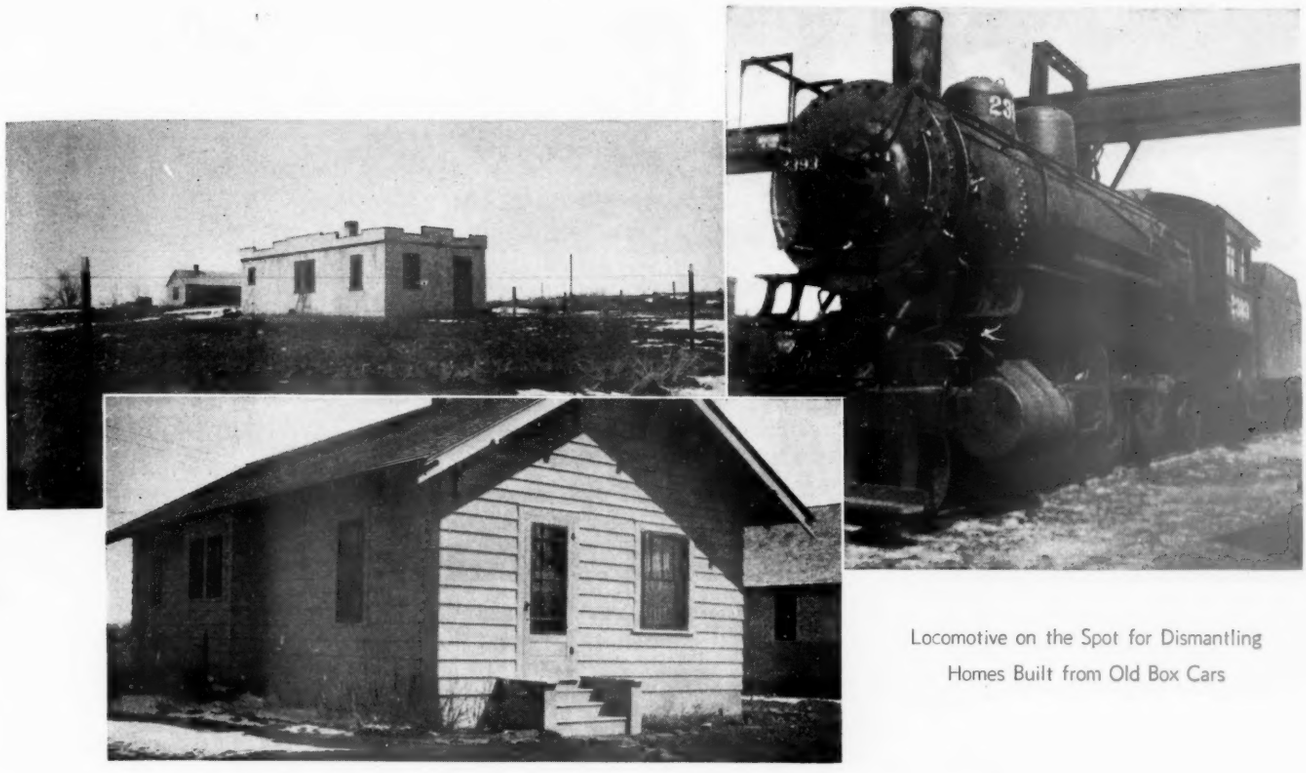
Until recently, the trend in the volume of buying by the railroads has reflected the completion of work financed by P.W.A. loans aggregating approximately $200,000,000 for all purposes, including labor, and the depressing effect of the widespread drouth on railway earnings, following a long period of enforced curtailment of agricultural production, which particularly affected the lines in the South and West. The uncertainties of federal policies, attended by the failure to enact legislation sought by the railroads, has also had a bearing on the situation.

Although the federal work relief program provides for the expenditure of at least $200,000,000 for grade separation and protection, difficulties encountered in formulating rules for the conduct of these projects has delayed the inception of this work. And with the exception of large air-conditioning programs which have now been completed in the Western territory, special inducements for buying were lacking until heavy rains throughout the West and more recently in the East created heavy demands for materials to repair flood damage to tracks, and brought many railroads face to face with the problem of increasing the supply of equipment to handle the traffic that is expected to result directly and indirectly from larger crop yields in prospect. The crop situation is a recent development which not only influenced purchases in May and June but is apparently causing many railroads to plan increased expenditures for supplies and especially for equipment during the next six months.

Less Rail and Ties in Stock

Book values of material in stock, which are always a factor in purchasing amounted on the first of May to a total of $305,800,000 for the Class I roads, as compared with $297,500,000 on January 1 and $304,900,000 on May 1, 1934. Based on reports of 75 railroads, fuel balances on May 1 were approximately $24,600,000, compared with $19,930,000 on January and $18,600,000 a year ago. Stocks of new and used rail amounted to approximately $37,500,000 on May 1, as compared with $36,800,000 on January 1 and $43,000,000 a year ago; crosstie stocks were $54,000,000, as compared with $47,200,000 on January 1 and $67,500,000 a year ago; and store stocks were $182,000,000 as compared with $181,000,000 on January 1 and $168,000,000 a year ago, not

(*Continued on page 78*)



Locomotive on the Spot for Dismantling

Homes Built from Old Box Cars

Northern Pacific Dismantles Much Equipment

Scrap-handling facilities of stores aid work—Old cars make homes and barns for employees and farmers

By H. M. Smith

General Storekeeper, Northern Pacific, St. Paul, Minn.

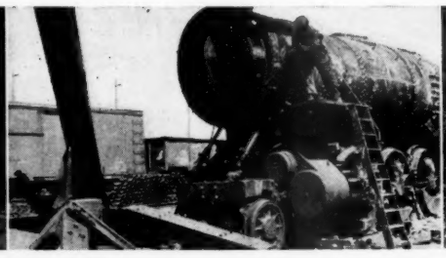
LAST July, on the Northern Pacific, it was decided to destroy more than 5,000 cars of various classes, including refrigerator, box, stock, automobile and steel gondola cars, and the work was scheduled on a regular monthly assignment at 22 car-repair points. This assignment varies from 75 cars per month at each of three large points, down to as low as 1 at small places, the total amounting to 350 cars per month. The actual output has exceeded the schedule by about 50 per cent, as the average for the first six months has been 530 cars. This is largely accounted for by the fact that approximately 100 cars per month, not in the schedule, have been fully dismantled by the stores department at the scrap-handling plants at Brainerd, Minn., and South Tacoma, Wash.

Procedure of Dismantling

The procedure of dismantling differs to some extent at the various points. At Brainerd, all-steel cars and some wooden cars are dismantled by the stores department, although the dismantling of most of the box and refrigerator cars is started by the car department. The first operation by the car department is to cut off the hand holds and to remove doors, running boards, roofs and air and hand brake equipment. After this work is completed, the bodies are lifted off the trucks and assigned to employees, who, outside of working hours, strip off the siding, roofing, decking and lining for the lumber

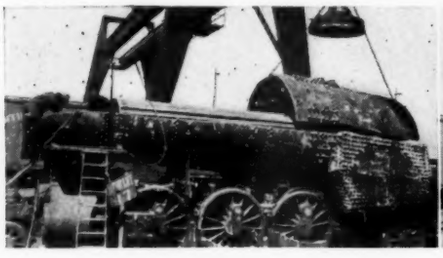
Bridge Built from Car Underframes

Removing Cab and Lagging

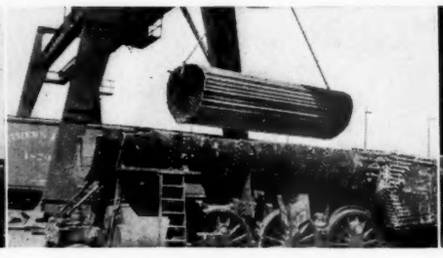


Front End Ring Saved

Boiler Top Ready for Sale



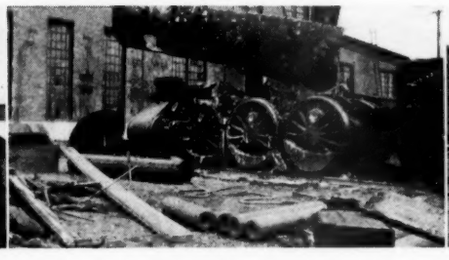
Detaching Crown Sheets



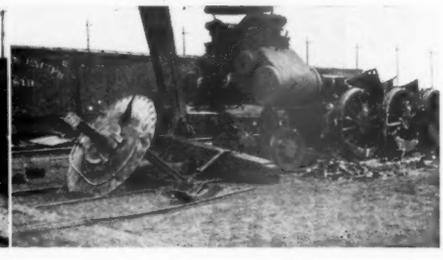
Flues are Set Aside

Moving Fire Box to Scrap Car

Air Gunning Saddle Bolts



Last Section of Boiler



Cylinders Intact to Storage

and firewood they obtain, the posts, braces and a portion of the sills being returned to the railroad.

After the bodies are stripped, the steel center sills and trucks are taken by the stores department, which continues the dismantling. The center sills and all bolsters not required for replacement on other equipment are cut into scrap of charging-box size. The steel side frame trucks are saved intact for replacing arch-bar trucks on active equipment, while the arch-bar trucks are dismantled and the wheels returned to the shop for inspection. At another shop point on the Eastern end of the railroad, where a schedule of 50 or more cars per month is maintained, the procedure is the same as at Brainerd, except that the car department does all dismantling.

Sell Cars to Farmers

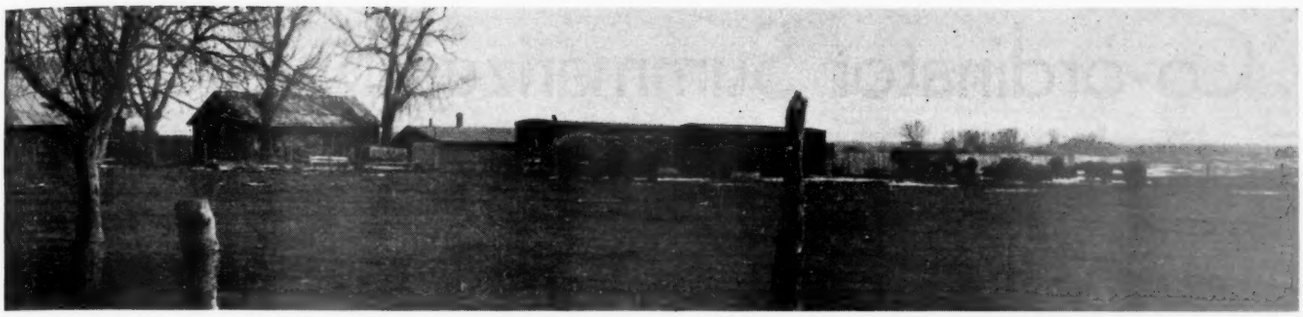
At Laurel, Mont., where a large car yard is maintained, 75 or more cars are dismantled per month and all work is handled by the car department, even to loading a large portion of the scrap and salvage material. At this point and at smaller points in the same territory, the bodies of box, refrigerator and stock cars are not dismantled, except to remove metal parts, but are kept intact and sold to farmers, merchants and other local people for from $35 to $50 each, depending on the class of equipment and its condition. The bodies are picked up at the dismantling point and hauled away by buyers for use as granaries and storehouses of various kinds, and are even made into dwellings. In this same territory, some of the steel underframes have been sold for use as farm bridges over streams and irrigation ditches.

At South Tacoma, Wash., all-steel gondola cars, and some wood body cars, are dismantled by the stores department, while most of the wooden cars are dismantled by the car department. Here, because of the availability and cheapness of lumber and firewood, there is no market for the complete bodies, and employees do not care to strip them for lumber and wood, so they are lifted from the trucks and burned, the steel underframes and trucks then being handled as at Brainerd.

Usable material, recovered from the dismantling operations at line points, is held in sufficient quantity for local requirements, and the balance is shipped to the main stores, where it is again culled to salvage reasonable stocks and the remainder converted to scrap. Wheels, improved couplers, patented draft gears, journal bear-

Lifting Frame. Trailer Wheels Saved. Others Scrapped

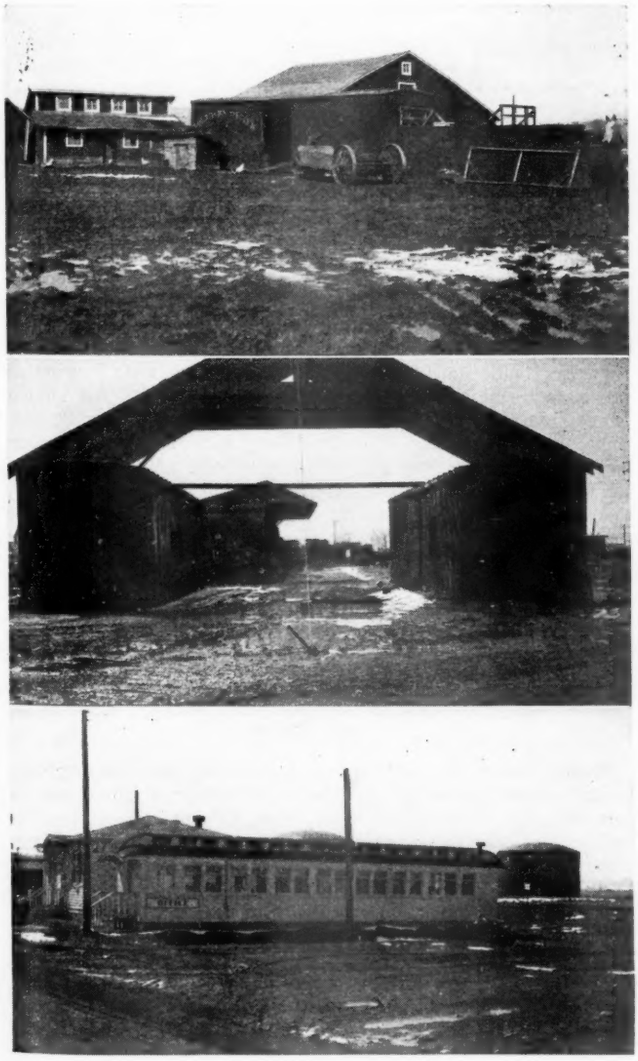
Cutting Flues from Flue Sheet



Some More Box Cars that Went Farming

ings, good journal bearing wedges, journal box packing, brake beams, brake hangers, compression rods, brake shoes and keys, lever guides and pins, brake wheels, angle cocks, cut-out cocks, air hose, retaining valves, release valves, triple valves and door fittings, if suitable for further use or repairable, are retained. All metal roofs are carefully removed and the best held in stock for application to other equipment, while the balance is used for making stove pipe, various items of tinware, bridge lining and many other purposes.

The cost of dismantling cars, as described, averages from $11 per car for flat cars, up to slightly less than $15 for refrigerator cars. A considerable portion of the total cost is offset by the sale of bodies, steel underframes and box car side doors, the doors being sold for 50 cents each.



Upper—Box Car Used for Bean Storage
Center—Building a Lumber Shed from Box Cars
Lower—Once a Passenger Car—Now an Office

Locomotive Dismantling

In addition to the continuous car program, there are usually two lots of locomotives scheduled for dismantling each year. This work is about evenly divided between Brainerd and South Tacoma, and is handled on the scrap docks of the store department with regular equipment and forces. All usable air-brake materials, pumps, gages, cab fixtures, lubricators, injectors, rods, etc., are first removed; then the jacket and lagging are removed and the lagging salvaged. The top half of the boiler is cut off horizontally and the flues removed and set aside, if suitable for repairs. The cutting then continues down through the frame and trucks, the scrap being picked up and placed in classification piles, and the usable material placed in regular stock as the work progresses. The locomotive tenders are handled separately in the same manner.

The cost of dismantling locomotives, including charges for cutting gas and other material, ranges from $55 to $110 per locomotive, depending on the type and size. The cost of the tenders varies from $2.25 to $11 each, depending on the size and type. The cost is governed, to a considerable extent, by the amount of material salvaged for further use, as more care must be exercised in removing usable material, and this means additional labor and cutting.

During this period, a considerable number of passenger cars, including coaches, diners, observation, parlor and front end cars, were retired and a ready sale was found for practically all the bodies, including fixtures and heating plants. These were purchased principally for use as summer cottages and lunch rooms, and their sales greatly simplfied the disposal of the passenger equipment as the trucks only were left for dismantling.

THE BOARD OF PUBLIC UTILITY COMMISSIONERS of New Jersey recently denied the application of the Central of New Jersey for permission to discontinue bus services between Hammonton, N. J., Winslow Junction and Bridgeton. The buses, operated for the railroad by Public Service Coordinated Transport, have been in service on the route since 1929 in substitution for trains formerly operated on the C.N.J. Southern division. While noting the losses from the operation of the highway line, the board nevertheless held that, if abandonment were authorized, "the communities on this route, served formerly by the trains that were discontinued and presently by the buses, will be seriously affected by the cessation of this service."

Co-ordinator Summarizes Studies in Railway Purchasing and Research

Control of patents and tie treating urged in report of Section of Purchases on technical improvement of equipment, roadway and structures

A REPORT has been made public by the Federal Co-ordinator of Transportation, in which the Section of Purchases reviews, with recommendations and suggestions, those ideas and inventions among the many considered by the section since its work began in July, 1933, which have appeared to warrant further investigation and development by railroads. The majority of the projects which have been presented to the co-ordinator, the report states, were of such a nature that a relatively brief study showed them to be impractical, or uneconomical, or both.

Specific fields in which there are notable opportunities for improvement, in the opinion of the section, are those dealing with the development of automatic train connectors, grade crossings, signals and accident-preventing devices, journal lubrication, lighter, stronger and rust-resisting alloys, improvements in the design, treatment and welding of rail and accessories, refrigeration and insulation, rust prevention, shock absorption and the treatment of ties and the development of substitutes for wood.

The report does not pass upon the merits of specific improvements but refers to the lack of research on railroads, urges cost accounting, favors publicity of employee ownership of patents and would treat all ties in company-owned tie plants. With the report is a list of approximately 48 types of devices which have been referred to the railroads for study. The report dwells at some length on patents as follows—

Inventions and Patents

The patent situation presents difficulties in the way of securing maximum advantages from new technical developments. With minor exceptions, practically all new devices and improvements to existing devices are "protected" in whole or in part by patents. Such patents may be owned by railroads, by equipment and supply manufacturers or dealers, or by individual patentees. Among the latter are many employees of railroads and other corporations. Comparatively few important patents in this field are owned by patentees who are not or have not been employed by railroads or by companies which sell to the railroads. The number of patents in the railroad field is legion. They range all the way from small items, such as nuts and washers, up to complete units of equipment and facilities.

The purpose of patenting any device is, of course, to secure a profit on its sale and use, which means that, other things being equal, a patented device will cost more than one which is not patented. In many cases, possibly a majority, this extra cost represents a fair compensation for the ingenuity, technical knowledge, or personal work of the patentees. In other cases, it greatly exceeds such fair compensation, and is obtained by the patentee, his assignees, or both, by reason of some favorable personal, commercial or financial situation or connection. It is obviously impossible to measure the effect of such situations in respect to even a small proportion of the thousands of patents in the railroad field, and general conclusions regarding that effect would be of no value. There are, however, certain phases of the patent situation which appear to offer definite possibilities for improvement, particularly if the A.A.R. will undertake to develop and follow a consisent policy for the benefit of the railroad industry as a whole.

Railroad Patents

Patents controlled by railroads are usually taken out in the name of one or more individuals, and either assigned to a railroad, used by that railroad under license, or assigned or licensed to one or more companies which sell to the railroad. On present information, it appears that a majority of such patentees are or have been employed by the railroad. It is doubtful whether under existing law the commercial arrangements between patentees and assignees or licenses can be directly controlled by order of the Association or of any other body. Such arrangements can, however, be influenced or modified through a process of education accompanied by adequate publicity. In certain other industries where the patent situation has proved to be a handicap, it has been straightened out through negotiation of cross-licenses, establishment of definite policies in respect to compensation of patentees, fostering of competitive patented or non-patented devices, and otherwise.

Patents controlled by supply companies include a far greater number of patents than the preceding one. The situation appears, however, to be a less difficult problem, in that the railroads have the final decision as to what they will buy, and through their Association can exert a strong influence on vendors. Such influence should be directed toward broadening their sources of supply by bringing about cross-licensing of patents for similar devices, and toward fostering development of competitive patented or non-patented devices, where necessary, to avoid being penalized through high prices resulting from monopoly. A few groups of manufacturers in the railway equipment and supply field already have cross-licensing agreements among themselves, amounting to a pool of patents and enabling the railroads to buy any device covered by those patents from any manufacturer in the group. Where such arrangements exist, the Planning and Research department of the Association should be most useful in providing current information to the railroads regarding costs, and in negotiating with the various manufacturer groups on behalf of all railroads.

Repair Parts

Manufacturers of built-up products, such as complete machines, usually try to require the users to buy all spare and repair parts from them. In some cases, this practice is justified by the fact that the manufacturer guarantees the complete machine, hence objects to having spare parts manufactured or bought outside, on the ground that their quality may be inferior to that of the original parts. At the same time, manufacturers' prices for spare parts seem in many cases to be unnecessarily high. Many parts of machines, such as bolts, gears, shafts, etc., are not themselves patented or patentable, and could be manufactured in railroad shops, even in small quantities, at a cost much lower than the manufacturer's price, with due regard for quality. In some cases, such parts can be bought from other sources at substantially lower prices. This subject is already being dealt with by the regional groups of railroad purchasing officers, and should be carried on under a consistent policy, with the help of the Planning and Research department, to the end

that all railroads may be able to buy or manufacture non-patented parts of patented devices at the lowest prices consistent with quality and cost.

Inventors on the Outside

Patents controlled by individuals are developed and controlled by individuals who are not connected with railroads or with equipment or supply companies. Many of such patents may be assigned by patentees to companies or other individuals for business reasons, but for present purposes they will be considered as owned or controlled by the patentees. Correspondence and personal contacts with numerous patentees during the past two years indicates that practically all of them who have developed new devices for railroad use have tried to sell their patents to one or more railroads or railroad supply companies for cash or royalties.

The number of valuable patents in this group is small in comparison with those in the other two groups, for the obvious reason that men employed by railroads or supply companies are far more likely than "outsiders" to possess the knowledge, experience, and technical ability required to conceive and develop worth-while inventions for railroad use. This statement refers only to the merit of inventions. As to the opportunity for realizing profits on the use of patented devices, the balance is even more strongly in favor of men who are or have been connected with the railroad or supply industries. It is not surprising that "outside" patentees find it difficult to interest railroads or supply companies in their projects. The physical property of the industry is enormously diversified in kind and purpose; any important changes are sure to be expensive; and it is only natural that men who have spent their lives in some particular branch of the industry should doubt the ability of outsiders to develop anything new and useful in their field.

The fact remains, however, that outsiders may, and in many cases do, develop new and useful devices for railroad use, and that the railroads should be in a position to investigate such devices, appraise their value, and secure maximum benefits from those which are found important in ultimate economy, measured by money savings or by improvement in service.

Purchasing Patents

Even a superficial review of the important inventions which have been or are now used in the railroad field will bring out the fact that many of them could have been acquired by railroads at favorable prices when they were first proposed. Among these are a number of the most widely-used devices, most of them now controlled by equipment or supply companies, for which the railroads have paid in the long run many times the amount for which they could have been acquired from the inventor by paying him cash or royalties exceeding in total his actual realization from his invention.

Few existing situations of this kind can be corrected now, but there seems to be no good reason why they cannot be avoided in future, and the general situation vastly improved as time goes on and existing patents expire. It should be possible to provide machinery whereby the A. A. R. could acquire valuable patents, on a cash or royalty basis, making them available to all roads, and create a wide competitive market in which the patented articles or devices could be bought. This applies not only to the kind of patents in this group, but to all patents, including such as might be developed by individual employees of the association itself.

Ties and Treatment

While at present, the demand for ties is at a low ebb, because of lack of money for replacements at normal rates, and because of the increased life of the large proportion of ties which have received preservative treatment during recent years, resulting in a technical overproduction of wood ties, the report considers that this situation cannot continue indefinitely and urges increased studies of the possibilities of different materials and designs for substitute ties. On the subject of ties, the report also states:

In the past, a large proportion of the railroads have owned and operated their own tie-treating plants. Within the past few years, however, an increasing number of roads have turned over this work under contract to large commercial wood-preserving companies. In view of the fact that the railroads use nearly 55 per cent of all treated timber, it seems probable that they should be able to operate treating plants at total cost at least as low as any prices which could be offered by outside plants. There appear to be certain tendencies toward developing monopolies in the wood-preserving industry, in connection with large companies which produce the basic materials used for timber treatment.

The question of tie specifications has been studied in some detail, in connection with purchasing problems. The fact is that the specifications are not followed to the extent which is desirable and possible. Methods of inspection vary widely because of differences in inspectors as to knowledge, experience and attitude toward vendors. In many cases, disputes arise between vendor and purchaser, the vendor claiming to have been injured by reason of improper or inefficient inspection. Similar disputes arise between the engineering and purchasing departments of railroads.

New Devices and Improvements

The list of new devices and improvements which were presented to the Section of Purchases during the past two years are as follows:

Engineering Field

Machinery for maintenance of way: Ballast cleaning machines. Two types submitted. One already in use, proposers trying to extend its use. The other still in the development stage.

Preservative compounds: Metal—Five kinds of corrosion-preventing and/or resisting compounds for use in protecting and preserving iron and steel. Two in fairly extensive use, with records of successful performance. Two others in development stage, but with favorable test reports. Wood—Asphalt preservative for ties. Not tested in service except on small scale.

Track materials: Complete track design—Three types submitted. Two successfully tried in short sections of roadway indicate long-time economy more than offsetting additional first cost. One not tested. Rail—New forms. Four types submitted which seem practicable. Two of them already in use to some extent. Heat treatment. Two methods submitted by responsible companies for building up and strengthening rail ends. Rail joints—One type already in extensive use. Four other types which seem practical. Rail joint bolts—Five types submitted.

Special track work: Crossings—Two types submitted, designed to prevent or reduce pounding. Both appear practicable and worth investigating. Neither in practical use. Switches—One new design of switch latch.

Spikes: One new design which appears practicable.

Ties (substitute): Concrete—Four types submitted, one of which has been tried in service on a small scale. All seem worth investigating Steel—Three types submitted, all of which seem worth investigating, although one is out of line with the others in respect to first cost. Composite—One type worth investigating.

Tie plates: Four types of steel plates, one in extensive use, others worth investigating. One rubber tie plate. Also two special plates included as part of complete track designs mentioned above.

Safety devices: Grade crossings—Three designs for accident-prevention equipment. One in limited use. Others seem practical.

Signals: One type of train stop and speed control device.

Structures: One method of strengthening bridges by adding structural members, pre-stressed. Successful on highway bridges.

Mechanical Field

Automobile loaders: Two devices submitted. One extensive use and the other in development stage.

Brakes and brake equipment: One new design of hand brake to prevent back spinning of wheel on release; practical. Three new designs for air-brake mechanism, worth investigating. One new design for brake-shoe release; practical.

Couplers: One new design.

Doors: Two new designs for grain doors. Three types of box-car door fixtures; undeveloped.

Journals: Four new designs worth investigating. One new

method for reclaiming packing. In use to a limited extent; practical.

Refrigerator equipment: Two new insulating materials, both practical, one in fairly extensive use. Two designs for mechanical refrigerators; undeveloped. Two methods for using "dry ice"; undeveloped.

Side bearings: Two new designs, one practical—other undeveloped.

Springs: Three new designs for spring snubbers; undeveloped. One new design for "air springs"; undeveloped.

Wheels: One design for "pneumatic" wheel; undeveloped.

Underframe: One design for cast underframes for box, gondola and flat cars. Practical and worth investigating.

Locomotive grates: Two designs, one in use, though not extensively.

Reverse gear: Three new designs, claiming substantial fuel saving. Have been developed but not used in service.

Lubrication: One new anti-friction packing material; tested. One new anti-friction bearing metal; tested.

Testing: One device for detecting cracked crank pins; tested.

Traction: One magnetic device for increasing traction.

Automatic connectors: Three types submitted. All have been tested by A. A. R. in laboratory and appear practical.

Disconnectors: Two types submitted; undeveloped.

Diesel locomotives: Four new types submitted. Three developed but not tried in service. One undeveloped, but seems practical.

Steam locomotives: One single sleeve-valve engine. One high-pressure condensing engine. Developed and built, but not tried in regular service.

Monorail systems: Four types submitted. None past development stage; all technically feasible.

Rail motor cars: Five types submitted. Two built and successfully tested; one in railroad service. Three others in development stage.

Rail—highway vehicles: Four types submitted which seem technically practical. Subject dealt with in reports of Section of Transportation service.

Containers: Eighteen types submitted. Subject fully covered in reports of Section of Transportation service.

Railway Supply Officers Convening to Discuss Problems

(*Continued from page 69*)

generally that its accomplishments have been vital factors in the success which the railroads have attained.

J. S. Pyeatt, President,
Denver and Rio Grande Western.

In view of the fact that the cost of materials and supplies represents approximately 30 per cent of railway operating expense, efficiency and economy in the purchasing and stores departments of the railroads are of prime importance. There is a decided responsibility for the welfare of the railroads in the hands of the officers trusted with the administration of the affairs of this phase of their operations. Their ingenuity and resourcefulness have been put to severe test during the lean days since 1929. I am sure the lessons learned in the adversity will make the meeting of the Purchases and Stores Division, Association of American Railroads, unusually productive of valuable ideas for the promotion of still greater efficiency and economy.

A. D. McDonald, President,
Southern Pacific.

Similar messages regarding the coming convention have been received from or on behalf of other railroad executives, including Carl Gray, president, Union Pacific; L. W. Baldwin, president, Missouri Pacific lines; S. D. Warriner, president, Lehigh & New England; H. D. Pollard, receiver, Central of Georgia; Norman B. Pitcairn, receiver, Wabash; L. F. Loree, president, Delaware and Hudson; J. M. Kurn, trustee, St. Louis-San Francisco; and M. S. Hawkins, receiver, Norfolk Southern. The report of the meeting will be presented in next week's issue.

$300,000,000 of Railway Supplies Since January

(*Continued from page 72*)

including $7,500,000 of scrap. The figures show greater amounts of material on hand than in January as was to be expected with a strike threat hanging over the coal industry, and with enlarged maintenance programs still under way, but it is especially observed that the stocks of both rails and ties were less this year than last year. Rail stocks, while larger on 17 of 47 roads than a year ago, were smaller on 30 roads, and tie stocks, while larger on 18 of 46 roads, were smaller on 28 roads. This is in keeping with the increased consumption of these materials in all parts of the country.

Materials and Supplies on Hand

	Fuel (000)	Cross Ties (000)	Rail (000)	Other Material (000)	Scrap (000)	Total (000)
May 1, 1935	$24,600	$54,000	$37,500	$182,200	$ 7,500	$305,800
Jan. 1, 1935	19,930	47,297	36,895	181,455	11,890	297,467
May 1, 1934	18,600	67,500	43,000	167,800	8,000	304,900

Materials and Supplies on Hand—May 1

	Rail—New & S. H.		Cross Ties	
	1935	1934	1935	1934
Alton	$142,237	$	$235,720	$ .....
Ann Arbor	17,837	20,025	20,062	25,073
Baltimore & Ohio	1,183,211	951,739	1,807,016	1,843,664
Bangor & Aroostook	122,175	215,402	96,255	131,146
Bingham & Garfield	21,418	.....	19,374	.....
Boston & Maine	679,800	1,070,111	1,450,591	1,926,108
Cambria & Indiana	5,861	.....	6,788	.....
Central of New Jersey	166,640	213,469	264,959	274,163
Central Vermont	82,062	109,758	56,973	79,168
Chicago & Eastern Illinois	11,978	118,452	105,968	125,563
Chicago & Illinois Midland	25,132	47,480	24,324	2,013
Chicago & North Western	1,477,357	1,803,507	1,326,818	1,746,475
Chicago, Burl. & Quincy	921,464	959,072	2,610,841	2,028,715
Chicago Great Western	29,320	.....	120,554	.....
Chicago, Ind. & Louisville	91,267	.....	86,445	.....
Chicago, Mil., St. P. & P.	1,272,624	687,656	3,107,198	3,014,354
Chicago, R. I. & Pac.	230,326	210,116	454,895	646,739
Chicago, St. P., M. & Omaha	107,418	148,039	344,966	267,005
Clinchfield	59,846	12,610	63,413	48,860
Columbus & Greenville	4,835	3,111	1,007	6,021
Delaware & Hudson	200,747	169,129	353,904	504,453
Detroit & Mackinac	9,832	.....	31,164	.....
Detroit & Toledo Shore Line	10,806*	.....	35,735*	.....
Detroit, Toledo & Ironton	127,070	.....	113,741	.....
Duluth, Missabe & Northern	85,476	95,473	269,400	352,551
Duluth, S. S. & Atlantic	62,569	48,622	49,487	43,636
Elgin, Joliet & Eastern	69,058	85,162	62,888	110,995
Erie	190,996	317,919	1,139,861	870,382
Florida East Coast	112,089	178,761	53,674	36,933
Fort Smith & Western	4,688	.....	8,759	.....
Great Northern	883,019	.....	1,655,597	.....
Illinois Central	64,464	68,663	1,382,306	1,155,309
Lake Superior & Ishpeming	15,939	24,104	16,086	17,925
L. & N. E.	99,123	84,608	37,095	51,531
Lehigh Valley	173,488	.....	370,568	.....
Louisiana & Arkansas	90,445*	47,380	205,895*	31,010
Louisville & Nashville	1,555,633	1,532,968	2,071,564	1,981,286
Maine Central	151,757	119,050	241,940	107,260
Minn., St. P. & S. S. Marie	172,081	211,095	485,496	502,367
Missouri-Kansas-Texas	353,892*	104,352*	448,866*	701,093*
Missouri Pacific	814,116	1,172,227	1,488,839	1,952,776
Mobile & Ohio	130,742	28,350	19,692	27,142
Monongahela	39,848	.....	31,942	.....
Nevada Northern	7,371	.....	20,219	.....
New York, New Haven & Hart.	1,361,531	443,734	612,603	622,776
New York, Ontario & Western	119,016	.....	155,326	.....
Norfolk & Western	986,329*	.....	955,611*	.....
Northern Pacific	.....	.....	.....	.....
Northwestern Pacific	49,607	66,670	26,432	28,126
Peoria & Pekin Union	18,528	.....	30,533	.....
Pittsburg & Shawmut	2,799	19,196	9,328	5,290
Pitts., Shawmut & Northern	14,739	14,813	4,798	42,168
Reading	789,561	685,419	560,653	724,424
Rutland	30,675	.....	74,550	.....
St. Louis-San Francisco	525,938	455,207	657,533	484,371
St. Louis Southwestern	85,693	505,947	81,905	194,753
Seaboard Air Line	692,309*	.....	422,842*	.....
Southern	512,743	806,985	529,500	593,248
Southern Pacific	1,700,227	1,725,092	1,774,895	1,198,625
Spokane, Port. & Seattle	102,612	.....	40,011	.....
Terminal of St. Louis	47,490	.....	16,038	.....
Texas & New Orleans	750,511	1,010,454	497,559	359,295
Texas & Pacific	68,406	78,552	206,967	121,638
Union Pacific	2,531,127	1,797,330	1,910,787	2,352,517
Utah	28,281	28,551	29,336	15,768
Virginian	159,902	.....	188,283	.....
Wabash	171,044	330,171	376,426	451,945
Western Pacific	209,200	397,686	70,380	124,796
Wheeling & Lake Erie	181,350	249,689	112,319	90,965
Alton & Southern	5,019	.....	1,060	.....
Missouri & Arkansas	9,047*	.....	4,994*	.....
Atchison, Topeka & Santa Fe	3,830,254	.....	1,015,997	.....

* April figures.

Government Issues Rules to Cover Federal Grade Crossing Work

Elimination, separation and protection to be fostered at no expense to the railways, and states are given opportunity to overcome obstacle of $1,400 man-year limit

THE long-awaited rules and regulations to govern the $200,000,000 federal railway-highway grade crossing elimination and protection program proposed under the Emergency Relief Appropriation Act of 1935, which rules and regulations were prepared by the U. S. Bureau of Public Roads under the Secretary of Agriculture, were approved by the President on July 12 and were promptly released by the Division of Applications and Information of the National Emergency Council. For those who have followed the grade crossing work carried out, whole or in part with federal funds during the last two years, and who have analyzed the preliminary rules laid down by the Bureau of Public Roads and the Executive orders of the President having to do with work to be carried out generally under the $4,000,000,000 work relief appropriation, there are few surprises. As a matter of fact, the rules and regulations appear as a whole to be in line with what was expected, and to reflect a sincere desire to see some effective work done to eliminate or to minimize the hazards to life at railway-highway grade crossings.

Relief Still Paramount

As expected, the rules and regulations have been built around the central thought behind the Emergency Relief Appropriation Act—employment for those on the relief rolls of the country—and thus they call for the expenditure for labor of so large a percentage of the money made available, that in this respect they may handicap or block entirely many projects, unless, as specifically provided for, the individual states agree under an alternate plan to assume the cost of added unemployment relief, in which case their grade crossing work will be relieved of the high labor-materials ratio stipulated.

As was expected also, it is pointed out specifically that the $200,000,000 grade crossing fund is available for the protection and elimination of grade crossings as well as for the separation of grades, and can be employed for work at practically any class or type of crossing where there exists a real hazard to highway and railway traffic. The rules and regulations reaffirm the fact that the railways will not be called upon to bear any part of the cost of the work, except possibly for right-of-way and property damages, and they in no way alter the earlier announced allotment of funds to the different states and the bases of distribution of funds to projects on the different railways, as reported previously in the *Railway Age*.

As hoped, the rules and regulations call for specific agreement between the state highway departments and the railways on all programs and projects, and at the same time give wide latitude in the selection of projects, the means of separation or of protection to be employed, and the specific manner of carrying out the work.

Following is a summary of those of the rules and regulations which are of greatest interest to the railways and which more directly affect their activities in co-operating with the state and federal highway departments to the end that the most effective work may be accomplished.

Wide Range of Work Possible

Within the limitations established by the rules and regulations, the $200,000,000 allotted from the $4,000,000,000 federal work relief fund for the specific purpose of eliminating the hazards to life at railway-highway grade crossings, is available to pay the entire cost of projects of the following character, exclusive of any charges for rights-of-way and property damages: The separation of grades at crossings; the protection of grade crossings; the reconstruction or improvement of existing grade separation structures; and the relocation of highways to eliminate grade crossings. No part of the fund may be used for strictly highway work, nor may any part of it be used for the separation of grades at railway-highway grade crossings on newly established highway routes which are not essentially parts of existing routes.

Under the rules, the above classes of work may be undertaken at crossings without limitation as to location, except that, without special permission, not less than 25 per cent of a state's apportionment must be expended for work at railroad grade crossings of secondary or feeder roads, which are defined as roads outside of municipalities and streets within municipalities which are not included in the approved federal-aid highway system or extensions thereof into and through municipalities.

The separation of grades at crossings may be by underpass or overpass and may include any necessary track elevation or depression and such additional work as may be required by changes in grade or alinement of the highway or relocation of the highway or railway tracks. In all cases, however, the cost of relocating and constructing the highway approaches to grade separation structures chargeable to the grade crossing fund will be limited to the work actually necessary and performed within 1500 ft. on each side of the nearest track of the crossing, measured along the centerline of the highway.

In the relocation of highways to eliminate grade crossings, the distance of relocation may be of any length, but it is stipulated specifically that the cost of such highway relocations shall not exceed the estimated cost of providing grade separation structures and approaches thereto for the crossings eliminated on the route, nor the estimated cost of providing to modern standards in the relocated section of highway, a type of road surface comparable to that on the portion of the route affected by the relocation.

The work of reconstructing existing grade separation

structures with the federal funds may include the strengthening and widening, or the relocation and rebuilding of the structures to add to the safety of highway traffic, except that the cost of approach work chargeable to the federal funds is limited, as in the case of new separation projects, to work 1500 ft. on each side of the nearest track. In view of this limitation, it is made clear that the federal grade crossing money may be used in conjunction with funds from other sources to accomplish work of greater magnitude than will be possible with the federal grade crossing funds alone.

Wide Latitude For Protection

Grade crossing protection is approved in lieu of grade separation for certain classes of crossings, and decision in this matter is left with the state highway departments, except that it is pointed out that the federal bureau may require, as a part of the federal program, the protection of specific important crossings, not already protected by acceptable devices, if it is found that elimination or separation of grades at these crossings cannot, for one reason or another, be accomplished with the federal grade crossing funds. Wide latitude is given in the matter of grade crossing protection, it being stated specifically that flashing-light signals, crossing gates, barriers, or other similar devices, satisfactory to the state highway department and the railroad affected, may be recommended.

The three following requirements are set up as regards acceptable flashing-light-type signals: (1) Recommended standards for flashing-light signals adopted by the Joint Committee on Grade Crossing Protection of the Association of American Railroads; (2) flashing-light signals conforming essentially to the standards recommended by the Joint Committee on Grade Crossing Protection of the Association of American Railroads which carry additional features such as a rotating disc or other devices which do not impair the operation nor detract from the uniformity or utility of the signals; and (3) wigwag signals of the magnetic type having standard signs and mounting height, a balanced outline reasonably in keeping with stationary lights with backgrounds, and an aspect, when operating, essentially the same as flashing lights.

As regards protection installations, it is required that, before federal funds may be used for any such installations, a definite agreement must be entered into by the state highway department and the affected railroad with respect to the maintenance of the installations. It is also required that plans and specifications for work of this character shall be in sufficient detail to define or describe the exact kind and quality of materials required, or in the case of an operating mechanism, to cover fully the essential requirements of the operating parts so that there may be effective competition in the purchase of materials or parts going into such installations.

Apportionment to the Railways

As pointed out by Thomas H. MacDonald, chief, Bureau of Public Roads, in a letter dated June 5, giving advance information to the district engineers of the Bureau, the rules and regulations provide that the federal money for grade crossing separation, elimination and protection within a state shall be apportioned, within practical limits, to the several railroads within that state in such manner that the total cost of the project or projects for the elimination of hazards to life at crossings on any individually operated railroad shall have approximately the same relation to the total apportionment to the state as the mileage of that railroad owned or operated in the state bears to the total mileage of all railroads owned or operated in the state. The mileage of high-speed electric lines in any state may be considered in connection with the programming of projects, and provision is made for the elimination of hazards to life at important main line crossings of roads which may have only a relatively small mileage in any one state.

Where a single structure or relocation eliminates grade crossings over the tracks of more than one individual railway, the cost of such structure or relocation is to be charged to the work performed on the different railways on the basis of the number of tracks owned by the different railways at the particular point in question.

Programming Projects

So far as practicable and feasible the projects to be undertaken with the federal money are to be selected with respect to their respective traffic hazards and the possibility of providing employment in areas where large unemployment exists. It is specifically set forth that the elimination or separation of grades at important crossings within or adjacent to the larger municipalities are particularly desirable types of projects, and that in any program, effort should be made to close outright crossings which are rendered unimportant by the relocation of highway routes or by the separation of grades at other nearby crossings.

Each state highway department is required to prepare in tabular form, for each classification of projects, programs of the grade crossing work desired to be undertaken, grouped for each individually-operated railroad, indicating the project number, county, location, proposed character of work, estimated man hours of employment, estimated quantity and cost of the principal kinds of materials entering into the work, the estimated total cost of the project, and the amount of the grade crossing funds desired. The programs may be submitted in whole or in part, except that no program of projects will be considered which involves less than 25 per cent of a state's apportionment.

The programs thus prepared are to be submitted to one of the district engineers of the Bureau of Public Roads for examination and review. Upon receipt of advice from him that they are satisfactory to recommend for approval, they shall then be submitted by the state highway department to the state director of the National Emergency Council and the state administrator of the Works Progress Administration for concurrence in a recommendation of approval before being returned to the district engineer of the Bureau of Public Roads for transmittal to the main headquarters of the Bureau for final action.

Approval of Individual Projects

As regards the approval of plans, specifications and estimates for individual projects under an approved program, the district engineers of the Bureau will have final authority, avoiding the delay and congestion which would result in having all detailed plans and supporting material pass through the main headquarters of the Bureau. Each individual project must receive final approval at Washington, but while awaiting such approval, the district engineers can permit advertising of the projects. Furthermore, the district engineers, with the concurrence of the state director of the National Emergency Council and the state administrator of the Works Progress Administration, can approve for construction, prior to formal action on a detailed program, plans and specifications for certain projects having a high order of priority with respect to providing employment and eliminating hazards. This authority is given to the district engineers in order to get projects of particular merit and unques-

tionable compliance with the rules and regulations, under way at the earliest possible date.

Basis of Approval of Projects

Under Section 6 of the rules and regulations, all projects proposed by a state highway department will be measured for approval on the basis of—(1) providing the equivalent of a man-year of employment on the project at a total cost to the federal government, including labor, materials and all other items properly chargeable to the work, of not exceeding $1,400 per man-year, or (2) that 40 per cent of the total cost of the project, including the cost of private property necessary to acquire in undertaking the project, go to persons directly employed on the project. Items properly chargeable to the cost of a project on which one of the above measures of participation will apply are as follows:

(a) Costs incurred subsequent to the allocation of funds under the Act (May 16, 1935) for surveys and the preparation of plans for projects which are approved for construction, except that no part of the overhead expense of a state highway department or other agency co-operating with the state in undertaking the work shall be included in such cost; (b) engineering costs for supervision of construction; and (c) all construction costs, whether by contract or force account.

If any state highway department desires to undertake work of a type or character in which the total cost is in excess of the cost limitations on which a project may be approved for full federal participation, such project may be approved provided that the obligation of the federal government is limited—(a) to $1,400 per man-year of employment or its equivalent of 90 cents per man-hour of employment for the number of man-hours of employment actually given on the project under the prescribed conditions of employment, or (b) to a figure representing 2½ times the amounts paid to administrative, executive and supervisory employees, and skilled, intermediate-grade and unskilled persons actually employed on the project under the prescribed conditions of employment, less the cost of private property acquired for the project.

The above high-percentage labor stipulations for the federal grade crossing work, together with the still higher percentage labor stipulations for certain other classes of federal works projects, were established initially by the President in recognition of the fact that only with such high labor ratios could work relief be afforded for all those on relief rolls with the $4,000,000,000 made available under the Emergency Relief Appropriation Act. However, sight was lost apparently of the fact that these stipulations were impracticable from the standpoint of most classes of grade crossing separation work, and if insisted upon, without alternative, would effectively block all but a relatively few projects of minor importance, or would require their execution in an inefficient manner.

In view of this situation, the rules and regulations issued provide for an alternate plan for insuring work for those on relief rolls, while not crippling the grade crossing program.

Alternate Plan to $1,400 Clause

Under the alternative plan provision, any state highway department desiring to do so may propose an alternate plan for the utilization of the federal grade crossing funds, and such alternate plan may be approved provided it satisfies the following conditions:

(1) That the state enter into a binding agreement with the Secretary of Agriculture to undertake grade crossing projects in accordance with all the rules and regulations promulgated for such projects, except with respect to Section 6, entitled "Basis of Approval of Projects," and such portions of other sections as directly relate to Section 6.

(2) That in consideration of such release from the requirements of the rules and regulations respecting "Basis of Approval of Projects" and such portions of other related sections, the state agrees to the five following stipulations:

(a) To take from the relief rolls and to give employment to its full quota of individuals (determined by dividing the allotment to the state for highway projects and/or grade crossing projects by the allowable expenditure of $1,400 per man-year of employment), or to provide the equivalent in man-hours of employment on the basis of 1,560 man-hours of employment per year (130 hours per month times 12 months), provided, however, that if the minimum wage rates established by the state highway department are such as to make possible monthly earnings substantially in excess of the schedule of monthly earnings established by Executive order for the general works program, by giving employment for less than 130 hours per month, the maximum hours of employment per month may be adjusted accordingly and the equivalent man-hours of employment per year may be computed on such basis.

(b) To give employment to all such individuals so employed at the determined wage rates and hours of employment for a period of one year, or the equivalent thereof in man-hours of employment on highway work under the direct supervision of the state highway department.

(c) To provide state funds to carry into effect this obligation to the extent necessary in excess of federal highway funds allotted the state.

(d) To co-operate with the Bureau of Public Roads and the Works Progress Administration in every way possible to make the relief employment effective and in harmony with the administration's work relief policies.

(e) To furnish certified copies of all payrolls on which work relief labor is employed under this proposal, showing the names of persons taken from relief rolls and the total man-hours of employment given to each.

To safeguard the interests of the government, the total federal reimbursement to the state at any time in connection with grade crossing projects approved under the alternate plan, shall not exceed the product of the total man-hour employment given to individuals from the public relief rolls on such projects and other projects undertaken by the state on which credit may be taken for its relief employment quota, multiplied by the allowable expenditure of grade crossing funds for each man-hour of employment given, computed as outlined in this section.

Methods of Effecting Work

Under the rules for carrying out grade crossing work under the federal program it is specified that surveys, plans, specifications and estimates for all classes of projects shall be prepared under the immediate direction of the state highway departments, although permission is given to these departments to detail all or any part of such work to the engineering organizations of the railways or to organizations of consulting engineers. Engineering charges reimbursable with federal funds will be confined to the payment of salaries of individuals actually employed on engineering details of the work, and will not cover engineering department overhead.

The design requirements for highway bridges as contained in the standard specifications for highway bridges adopted by the American Association of State Highway

Officials are to obtain with respect to structures carrying highway traffic over the railways, and the requirements of the American Railway Engineering Association are to apply in connection with the design of structures carrying railway traffic.

Wherever feasible and practical, it is intended that the work shall be done under contract, however, provision is made whereby the work can be carried out, whole or in part, on a day labor or force account basis by the highway department forces or other organizations which it may designate. It is specifically provided that all work necessary for the maintenance of railway traffic, including the construction of temporary supporting trestles, track and signal adjustments, the rearrangement of telephone and telegraph lines on the right-of-way of the railroad, and auxiliary drainage work, may be undertaken on a force account basis by the railroad company with its own forces, and will be paid for out of the federal money.

All projects are to be advertised and all contracts are to be let to the lowest qualified bidder, who need not be a resident of the state in which the work is located. All contracts will be required to contain special provisions to give effect to requirements respecting wages, hours of work, conditions of employment, etc., and a specific stipulation that they are subject to modification in the event of subsequent legislation affecting hours, wages, and working conditions of employees involved in the production of materials and supplies purchased by the contractor and entering into the work.

Unless for special reasons, approved prior to the awarding of a contract, it will be required that the successful contractor shall perform not less than 80 per cent of the work, although there is nothing in the rules to prevent subletting substantial parts of the work on any project if due notice in this regard is given and advance approval is received.

Materials and Labor

The only stipulations as regards materials, equipment and supplies to be used on any of the various types of grade crossing projects are of a nature to insure that preference is given to those produced in the United States. The contractor will furnish all materials necessary to the fulfillment of his contracct in accordance with plans and specifications. On direct labor or force account work, all materials are to be purchased under competitive bids, except in the case of minor quantities, which may be purchased locally.

Preference in the employment of labor must be given, except in the case of executive, administrative, supervisory and highly skilled positions, to persons from the public relief rolls, and 90 per cent of all persons employed on a project must be taken from such rolls. The minimum wage rates for employees will be established by the highway departments, subject to the approval of the Bureau of Public Roads, but it is expected that these rates will be reasonably comparable with the hourly rates paid by the state highway departments with their own funds for work of a similar character.

The maximum hours of labor for manual labor is established at 8 hours a day and 130 hours a month, and that for clerical and other non-manual employees at 8 hours a day and 40 hours a week, except that on projects so remote from centers of population as to require boarding equipment for labor, all labor may be put on the 8-hour day, 40-hour per week basis.

Maintenance of Projects

Nothing is contained in the rules and regulations relative to the maintenance of grade separation or elimination projects on federal-aid roads or extensions thereof into or through municipalities, and there are no provisions requiring the railroads to assume any part of the cost of maintaining separation structures built on any class of road or street. On the other hand, it is stipulated that agreements for secondary or feeder road projects, and for projects within municipalities, shall provide for the maintenance of such projects by the state where the law permits the state to undertake such maintenance; otherwise the state shall submit, in the form prescribed by the Secretary of Agriculture, an agreement with the county, municipality, or other political subdivision for such maintenance.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended July 6, which included a holiday, totaled 472,421 cars, a decrease of 145,615 cars as compared with the week before and of 48,320 cars as compared with the corresponding week of last year. All commodity classifications showed reductions as compared with the week before the holiday but miscellaneous freight, forest products, and coke, showed increases as compared with last year. The summary, as compiled by the Car Service Division of the Association of American Railroads, follows:

Revenue Freight Car Loading

For Week Ended Saturday, July 6

Districts	1935	1934	1933
Eastern	106,251	111,124	118,400
Allegheny	87,286	103,528	110,672
Pocahontas	24,022	35,035	37,744
Southern	67,699	69,152	78,660
Northwestern	74,041	75,697	73,053
Central Western	71,828	82,666	80,090
Southwestern	41,294	43,539	44,891
Total Western Districts	187,163	201,902	198,034
Total All Roads	472,421	520,741	543,510
Commodities			
Grain and Grain Products	23,887	37,152	45,068
Live Stock	8,615	15,554	13,493
Coal	50,186	81,438	90,035
Coke	4,794	4,135	6,300
Forest Products	22,040	17,373	21,851
Ore	30,043	29,372	18,036
Merchandise L.C.L.	135,001	137,968	146,760
Miscellaneous	197,855	197,749	201,967
July 6	472,421	520,741	543,510
June 29	618,036	646,003	641,730
June 22	567,847	623,322	609,627
June 15	653,092	618,881	592,759
June 8	630,836	616,768	569,157
Cumulative Total, 27 Weeks	15,648,478	15,957,364	13,887,810

Car Loading in Canada

Car loading in Canada for the week ended July 6 totaled 39,835 cars as compared with 45,436 cars for the previous week and 39,947 cars for the corresponding week last year, according to the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
July 6, 1935	39,835	18,614
June 29, 1935	45,436	20,680
June 22, 1935	43,580	21,483
July 7, 1934	39,947	18,785
Cumulative Totals for Canada:		
July 6, 1935	1,153,820	599,021
July 7, 1934	1,134,761	620,877
July 8, 1933	941,149	479,017

Lower Basic Passenger Fares Recommended

I. C. C. examiner proposes two-cent fare in coaches and three cents in Pullmans

WASHINGTON, D. C.

ON the ground that extraordinary measures are imperative to enable the railroads to regain their passenger traffic and to insure a reasonable share of the increased intercity traffic of the future, Examiner Irving L. Koch of the Interstate Commerce Commission has recommended in a proposed report made public on June 17 that the commission find the present regular basic passenger fare structure throughout the country to be unreasonable. For the future he recommends that the commission prescribe a maximum reasonable basis of two cents per passenger-mile in coaches and three cents per passenger mile in Pullmans, while finding that the experimental fare bases in the southern and western districts are not unreasonable or otherwise unlawful. He also recommends findings that the present Pullman surcharge is unreasonable and should be eliminated, that extra fares now charged for extraordinary and supplemental or alternative Pullman service have not been shown to be unreasonable or otherwise unlawful, but that passenger fares in some instances are in violation of Section 4 of the interstate commerce act. Oral arguments on the report will be heard by the commission at Washington on October 3 and 4. The report was submitted in connection with the investigation of the passenger fare situation ordered by the commission on its own motion, on which hearings were held earlier in the year by Commissioner Porter and Examiner Koch, described in the report as "the first comprehensive investigation made by the commission of the passenger-fare structure of the country." As summarized in the report Examiner Koch recommends that the commission should make the following major findings of fact and conclusions:

Findings of Fact Recommended

1. The passenger traffic and revenues of respondents generally have declined so severely, before as well as during the depression, that extraordinary measures are imperative in order to regain such traffic and insure to the railroads a reasonable share of the increased intercity traffic of the future.

2. The passenger market of the future looks as promising as at any time in the history of the country, but the railroads cannot hope to share reasonably in that market except at fares more nearly commensurate with the price and convenience of travel by highway, and with changed economic conditions.

3. The relatively unsuccessful efforts made by respondents to stem the decline in passenger traffic and revenue by improved service and facilities, together with the favorable revenue results from experiments in reduced fares in the southern and western districts, afford adequate proof that the principal remaining remedy for the passenger difficulties of respondents is a reduction in fare.

4. Improved revenue results in the southern and western districts under the experimental fares are due largely to such reduced fares and not in any great degree to improved business conditions, and such revenue results may be expected to continue to improve as the public becomes increasingly alive to the enhanced passenger advantages offered by rail.

5. The circumstances and conditions affecting passenger traffic in the eastern district, as compared with the southern and western districts, do not differ in sufficient degree to warrant the opinion that substantial reductions in fare in the eastern district would not result in improved passenger revenue for the eastern respondents.

6. Changed economic conditions, including reduced commodity prices and average income, together with the generally cheaper price and greater convenience of travel by highway, have so affected the value of the rail passenger service to the public that a fare basis which was reasonable maximum before severe highway competition, and especially before the fall in recent years in commodity prices and average income, is out of harmony with present-day economic conditions.

7. Considering the greater costs to respondents for furnishing the Pullman service than for furnishing the coach service, and the greater effect of highway competition upon the coach than upon the Pullman service, a spread of 50 per cent or 1 cent per mile between one-way fares for the two services is the minimum that should be applied by respondents generally.

8. Giving appropriate consideration to all the evident circumstances and conditions which are likely to affect the ultimate result, a maximum fare basis, one way and round-trip, for general application, of 2 cents per mile in coaches and 3 cents per mile in Pullmans would be most likely to lessen the transportation burden of respondents and to harmonize with present-day economic conditions, with consequent fuller assurance to the respondents of realizing a fair return upon their property investment. There is doubt whether perhaps in one or more of the major districts of the country a coach fare of 1.5 cents per mile might not produce better revenue results for respondents than any higher fare, and it may also be that round-trip fares on both coach and Pullman traffic at a lower rate per mile than the one-way fares herein recommended would bring to respondents better revenue results than the higher fares. It is recommended that these doubts be resolved in favor of respondents, and in the interest of a uniform fare basis for general application throughout the country, but without prejudice to the establishment or continued maintenance of a lower fare basis than is herein recommended in any one or more of the major districts of the country.

9. The Pullman surcharge has met with such marked public resistance that it is resulting in greater injury than benefit to respondents.

10. Extra fares on some of respondents between the principal cities for extraordinary Pullman service appear to be beneficial and desirable to both respondents and the public, provided that the passenger service rendered between the same points at the regular fares is adequate.

Conclusions

The Commission should conclude that:

1. The Pullman surcharge is and for the future will be unreasonable, and should be eliminated.

2. The regular passenger-fare structure of respondents is and for the future will be unreasonable and in contravention of Section 15a of the act to the extent that it exceeds or may exceed fares of 2 cents per passenger-mile, one way and round-trip, in coaches, and 3 cents per passenger-mile, one way and round-trip, in Pullman cars; without prejudice to the maintenance of lower fares in coaches or in Pullman cars, or both, in any one or more of the major districts of the country; provided, that reasonable extra fares, in addition to the regular passenger fares and Pullman charges for space, may be charged for passenger service which is definitely superior to that generally furnished, upon the condition that reasonably prompt and comfortable regular through service without extra fare be available to the public at hours which are equally as convenient as those at which the extra-fare service is operated.

3. The present experimental fares in the southern and western districts are not unreasonable or otherwise unlawful.

4. The present extra fares wherever maintained are not shown to be unreasonable or otherwise unlawful.

5. Many of the present fares are violative of Section 4 of the

act in that, while subject to varying designations or to varying time-limit, stop-over, or baggage restrictions, they are, nevertheless, fares of the same character. Respondents should be expected to abide by the law in respect of these fares.

6. Nothing herein is intended to restrain respondents from exercising their right under Section 22 of the act to issue mileage, excursion, or commutation passenger tickets.

7. All outstanding Section 13 orders affecting intrastate fares which are inconsistent with the conclusions herein recommended should be vacated or modified in harmony with these conclusions.

The report points out that since 1923 the railroads have been suffering severe losses in passenger traffic and revenues and that at least since 1926 passenger traffic has not contributed its full share to the rail transportation costs. In various cases and in annual reports the commission has commented on the large losses in passenger traffic and revenue and the need for an adequate remedy. The carriers generally have shown much concern about this matter, especially in recent years, and some of them have made great improvements in their service and equipment, but, the report says, with some exceptions, their passenger traffic and revenue have shown little or no improvement. Following are some extracts from the report:

Financial Results From Passenger Services

Based upon the commission's formula for segregating freight and passenger service expenses, prior to about 1926 rail passenger traffic was in general quite profitable. In that year passenger-service expenses, including taxes and operating rents but not interest, about equalled the revenues. Thereafter, deficits in increasing amounts occurred until in 1931, 1932, and 1933 for the country as a whole it exceeded $200,000,000 annually. Leaving out of consideration taxes, rentals, and interest, the net revenue from passenger and allied (mail, express, etc.) services decreased from $281,784,300 in 1923 to $128,154,700 in 1929, following which each year has closed with a deficit, amounting to $112,899,200 in 1932 and $111,358,100 in 1933. Such deficits have been greatest in the western district, the first one appearing there in 1928, and in 1933 it was $68,715,800, or about $4,000,000 less than in 1932. In the southern district the first such deficit occurred in 1930 and in 1933 was $31,141,900, or about $5,000,000 less than in 1931 and 1932. In the eastern district the first such deficit made its appearance in 1932, when it was $4,522,200, and in 1933 it increased to $11,500,400. These deficits do not necessarily mean an out-of-pocket loss, as the expenses include a proportion of common maintenance of way and general expenses. If all of these were charged to freight, the net revenue in 1933 from passenger and allied services before taxes would have been $45,377,000 in the East, a deficit of $10,192,000 in the South, a deficit of $21,093,000 in the West, and a net of $14,092,000 for all districts.

In table I of appendix 1 is a statement of the revenue and total operating expenses per passenger train-mile and per car-mile of all passenger-train cars, including maintenance of way and general expenses, but excluding water-line and miscellaneous expenses and also taxes, rentals, and interest. It will be noted that the car-mile revenue exceeded the expenses up to and including 1930, but thereafter the opposite has been true, and in 1933 the revenue per car-mile was 20.6 cents and the expenses 23.8 cents. It should be borne in mind, however, that these expenses for 1932 and 1933 are depressed by the temporary 10 per cent reduction in wages and reflect greatly depressed traffic and maintenance. The unit operating expenses in this table make no allowance for the fact that the dining cars and most of the baggage space pay no revenue. If this fact were considered it is estimated that at least 2 cents would be added in arriving at the average expense of a revenue passenger-carrying car-mile.

The foregoing leaves no doubt that, at least since 1926, passenger traffic as a whole has resulted in steadily mounting deficits which reached their peak in 1932 and receded only slightly since then. The eastern carriers call attention to the substantial increase during 1934 compared with the previous year in the cost to them of materials and supplies, as well as employees' wages, and to the heavy funded debts maturing in the near future. These or similar figures, indicating a marked increase in transportation costs since 1933, were recently discussed and weighed in *Emergency Freight Charges, 1935*, 208 I.C.C. 4. It is evident without further demonstration that respondents generally are in dire need of greater revenue, especially from the passenger service.

It seems certain that the future travel desires of the American public will increase with the years and that, with attractive service and price, promoted by modern sales methods, the railroads should have little difficulty in developing a travel volume for themselves greater than any which they formerly enjoyed. It seems just as certain that, no matter how much of an increase in travel volume there may be in the future, travel by railroad will continue to decline, or at least will not increase nearly as much as the increase in total volume, unless it is made more attractive than it has been in the past.

The only important remaining avenue of appeal to the public is that of a reduction in fares. It is this appeal of reduced cost of transportation which must have been largely responsible for the unprecedented diversion of passenger traffic from the rails to the highways, commencing in earnest with 1924. Some of that diversion undoubtedly was caused by greater convenience in the use of the private automobile than of the train, and to the extent that such is the case, respondents' efforts toward improved service are having, and should continue to have, results favorable to the rails, but the decrease in rail passenger-miles in round figures from 38 billion in 1923 to 31 billion in 1929, or 18.4 per cent, while passenger travel as expressed in total intercity passenger-miles increased from 66 billion to 239 billion, or 262 per cent, affords small hope that improved service will bring back a substantial volume of passenger traffic to the rails. Especially does such a claim seem hopeless when it is borne in mind that in the last decade the improvements in motor transportation have been far greater than the improvements in rail transportation, and probably will continue at least to keep abreast of the improvements by rail.

As will later appear in greater detail, both prior and during the depression, respondents have devoted much effort to win back passenger travel through special fares for special purposes, including week-end and special-day excursions. The results from these efforts have generally been gratifying, but they have left untouched the great portion of the public whose convenience is not suited to such fares, or who have become accustomed to motor travel or to stay at home, and who can be induced to use the rails only by a general reduction in fares.

The passenger business of respondents is responsible for a very substantial portion of their traffic and gross revenue. Even today, after having lost about two-thirds of their passenger traffic, the revenues from passenger-train service constitute more than 16 per cent of the total railway revenues, exceed in volume freight revenues from all less-than-carload traffic (7 per cent), products of agriculture (15 per cent), animals and their products (6 per cent), and products of forests (4 per cent); and are exceeded only by revenues from the products of mines (25 per cent) and manufactures (27 per cent). Prior to 1923 revenues from passenger-train service exceeded 25 per cent of total revenues, and passenger revenue alone was over 20 per cent of the total. A substantial increase in traffic constituting so large a part of the whole is fraught with great possibilities in improved revenues.

The Eastern Situation

The eastern carriers insist that a fare reduction, unaccompanied by a substantial increase in service, particularly on the branch lines, would be of little avail in securing increased traffic. It is to be expected that in order to accommodate the additional traffic a car or more, and perhaps a section of cars, would have to be added to some of the important trains in the eastern district, especially on the three systems, which are now running fairly well to capacity, and that, especially between some of the more important points, additional trains might have to be placed in service, but there is no reason to believe that the increased train-miles and car-miles thus entailed would not return more than their share of the additional transportation burden. On branch lines the train service has been more severely curtailed than elsewhere, and a substantial increase in traffic on such lines would probably require a greater increase in service than would be the case on the main lines. There is reason to believe that this has been the experience of the southern carriers, but probably in less degree, for the branch-line mileage is relatively greater in the East than in the South. Whether the passenger service, or at least the increased service, on certain branch lines could be more economically rendered by a co-ordinated bus transport is a matter which should have immediate and sympathetic consideration by respondents. It must be remembered that these respondents in 1922 carried approximately three times as many, and less than six years ago approximately twice as many, passengers as they are carrying now. This record amply justifies the belief that at reduced fares the eastern respondents would be more likely to again carry the number of passengers which they formerly did, and come closer to making a profit on their passenger service, than could possibly be the case under their present fare structure.

Viewing the record as a whole, and giving full weight to the claims of respondents favoring the present fare adjustment, it seems certain that the revenue results under reduced basic fares of 2 cents in coaches and 3 cents in Pullmans would be more favorable to such respondents than under any higher basic fares. It is debatable whether an even better revenue showing might

not result from basic fares of 1.5 cents in coaches and 3 cents in Pullmans, and whether in any event it would not be the better policy for the railroads, in order to win public favor and to place themselves in the most advantageous position in the race, now in progress and certain to gain in intensity as prosperity returns, to meet the increasing demand for passenger transportation, to establish basic fares in both coaches and Pullmans below the level which can now be safely expected to yield better revenue results for the carriers than would likely obtain under the present fare basis, in the confident purpose that when, by such stimulation, substantial gain had been made in public favor, the basic fares might be somewhat increased. Such action, however, should be left to carrier discretion and the commission should prescribe only the reasonable maximum basis of fares, determined in the light of the revenue results which may be immediately anticipated and of those additional considerations which reasonable men experienced in these matters would regard as important in arriving at a fair judgment upon the reasonable fares to be applied.

There is no reason to believe that the ratio of the costs of operating the coach and the Pullman services in the eastern district vary substantially from that in the other major districts, nor that the factor of competition in respect of coach traffic as compared with Pullman traffic is less forceful in the East than it is in the South and the West. The considerations which should move the commission not to condemn the present spreads between the Pullman and coach fares in the southern and western districts should likewise lead to the conclusion that, under present circumstances at least, a minimum spread of 1 cent between the one-way fares in coaches and Pullmans would be reasonable and otherwise lawful for general application.

Rival Groups Demand Pension Law

WASHINGTON, D. C.

A DETERMINED drive to push through Congress at this session another railroad pension bill to take the place of the railroad retirement act set aside by the Supreme Court on May 6 is being made by organizations representing railroad employees, but rivalry and differences between them as to details of the plan and as to the expedients considered necessary to overcome the sweeping objections of the court were brought out at a hearing on the bill before Senator Brown, of New Hampshire, as chairman of a sub-committee of the Senate committee on interstate commerce, on July 11. These differences interjected elements of delay into what was evidently intended to be a summary proceeding and finally caused an adjournment to next Tuesday. A similar hearing was begun before a sub-committee of the House committee on interstate and foreign commerce headed by Representative Crosser, of Ohio, on July 16, and an effort to enlist the support of the President was made when a delegation of the legislative committee of the Railway Labor Executives' Association called on him at the White House on July 12. The President had attempted to postpone the matter by urging the creation of a special committee to study the subject further in the light of the court decision.

The bill under consideration is S. 3151, introduced by Senator Wagner, of New York, and H. R. 8651, introduced by Representative Crosser, proposed by the Railway Labor Executives' Association and designed to get around the court's objections by providing for the payment of pensions to employees of the railroads and railroad labor organizations out of a federal government appropriation, while another bill, S. 3150, introduced at the same time but referred to the finance committee, proposes to raise approximately the necessary amount of money by imposing taxes on the railroads and their employees. The labor organizations are especially anxious to have the pension bill passed because, if sustained, it would force thousands of the older employees to retire and create employment opportunities for younger men, but evidence that some of the older men are not eager to exchange their jobs for pensions on the scale proposed was given when John T. Corbett, national legislative representative of the Brotherhood of Locomotive Engineers, urged an amendment to increase the maximum pension allowance from $120 to $200 a month.

The principal difference, however, was between the Railway Labor Executives' Association and the Railroad Employees' National Pension Association. Represented by Timothy Shea, assistant president of the Brotherhood of Locomotive Firemen and Enginemen, as chairman of the legislative committee, and E. A. Krauthoff as counsel, the former organization sought to make a very brief presentation, relying largely on testimony introduced at hearings on the former bill, but the other, which claims much of the credit for putting the retirement act through Congress, complicated the proceedings by proposing numerous amendments and another method of approach to the constitutional question. It also asked to have its representatives made eligible for pensions on the same terms as those proposed for those of the standard labor organizations, who would be made eligible by contributing a tax of 6 per cent on their wages up to $300 a month.

W. W. Royster, president of the pension association, said it desired to support the bill, with modifications, and that there was no "split" between the two organizations, although there had been a lack of co-operation between them in the past, and H. L. Ekern, counsel for the association, said that although he believed the idea of separate bills offered one way to meet the problem of the attitude of the court, he nevertheless thought it would be better to include such findings of fact and declarations of policy by Congress as would require the court to sustain a pension bill as a regulation of interstate commerce. Mr. Krauthoff argued that the two-bill plan is constitutional on the ground that the government may impose taxes and appropriate money for any purpose, but Mr. Ekern pointed out that if the court should take the other view the proposed legislation would again be futile. Asserting that state pension statutes have been sustained on the ground that they carried benefits to the state, he said Congress could put up such a finding of facts that the bill would have every chance of being approved. He proposed a long declaration including not only statements that the pension plan would promote safety and efficiency but also that it would relieve the roads of the burden of carrying superannuated employees and at the same time relieve the taxpayers of supporting them as public charges, and that the pension payments would be a charge against the public because included in operating expenses and rates. He told the committee that there was no occasion to worry about the stock and bond holders because the payments would be charged to operating expenses.

The principal amendment proposed by Mr. Ekern was one to include the prior service, in computing pensions, of men who have left the service but return after passage of the act. The bill covers only those having an employment relation at the time of or after the enactment. He also proposed a study of existing pension systems to provide a method for continuing them where the roads desire to continue voluntary payments beyond those required by law, as in the case of officers, and asked that provision be made for joint survivor annuities so that a man might leave part of his pension for his widow.

R. V. Fletcher, vice-president and general counsel of the Association of American Railroads, asked Mr. Krau-

thoff if the two bills were not to be considered together and if it would not be unfortunate if one were passed without the other. Mr. Krauthoff said he understood the purpose of the question and that he was willing to leave the matter to Congress because the bills spoke for themselves. Asked about the relation between the railroad pension bill and the general social security bill, which contains no exemption of railroads and which provides for equal contributions by employers and employees, with a maximum pension of $85 a month, he said that whichever bill was passed first could carry an amendment to exempt railroads from the general bill. One purpose of the bill, Mr. Krauthoff said, was to promote employment, and another was to provide for pensions as a matter of right without the "slavery" involved in the requirement of continuous service for one system in the voluntary pension plans of the railroads.

When the hearing was resumed on July 15 Mr. Krauthoff presented a modified draft of the bill, including some changes apparently made to meet some of the suggestions made by Mr. Ekern. This caused Senator Brown to ask how it was expected that the committee could agree on a bill if the organizations could not. "You can't expect us to settle your battles," he said. "If you expect to get a bill through I wish you would come in here with one bill and not come in and find fault with each other's arguments." He added that the pension bill had "been around for three or four years" and that it would be necessary to conclude the hearing by midnight or put it off for another week. It was stated also that it would be impossible to complete the statistical estimates of the costs of the plan if it was to be changed further. Mr. Krauthoff said the draft represented the "final" bill of the Railway Labor Executives' Association, and it was decided that the opponents of the bill should be heard and that representatives of the labor organizations should meet at noon in an effort to reach an agreement or decide that an agreement was impossible. Later Mr. Krauthoff announced that they had failed to find any basis of agreement. He pointed out that the Supreme Court had very severely criticized the provision in the act for retroactive pensions for men who had left the service and returned, that the plan for survivorship annuities would impose an additional administrative burden, and that the pensions for representatives of labor organizations should be limited to those recognized under the railway labor act. He also objected to the declaration of facts proposed by Mr. Ekern, saying the court would want to determine whether they were true and that they would give opposing counsel further opportunities for attack.

R. V. Fletcher, in a statement opposing the bill, said it was open to the same criticisms as the retirement act and that the railroads "will, of course, be forced to litigate it if passed." He recalled that the former bill had been passed against the recommendations of Co-ordinator Eastman, who had asked that Congress await his report on the subject, that President Roosevelt had signed it reluctantly, saying it was crudely drawn, and that he has recently urged that further study be given the subject by a special commission. He said the present bill is also crudely drawn, without regard to sound actuarial principles, and with no provision for meeting the great increase in cost from year to year.

Judge Fletcher also argued that the new bill is just as unconstitutional as that set aside by the court and pointed out that the court had not only held that there was no power in Congress under the commerce clause to enact pension legislation but that it had also held various features to be violative of the due process clause which are still in the bill. One of the most emphatic criticisms in the decision, he said, was that of the disregard of the separate ownership of the railroads and their treatment as a single system, taking into consideration all service on all railroads whether continuous or not, and the court had also held that the provision for inclusion of officers of labor organizations was arbitrary and unreasonable, having no relation to the declared purposes of the law. He said there would be great difficulty in justifying to Congress and the country the selection of railroad employees for preferential treatment to the exclusion of employees of competing forms of transportation and other members of the public, and that the court has held that classifications shall not be made arbitrarily but must be based on some real difference. He also said that S. 3150 does not "ring true" as a revenue bill, because in imposing the tax it stops at $300 a month.

Discussing the question as to how far the taxing power of Congress may be used to accomplish something that cannot be accomplished under the commerce clause, Judge Fletcher said that in cases where such a course has been sustained by the courts the social ends have been incidental to the revenue purpose and that the fundamental question is whether Congress will preserve the spirit of our Constitution and our whole government. To impose this tax on railroads and their employees and not on other forms of transportation, he said, represents an "arbitrary and capricious preference in violation of the fifth amendment." When he referred to the fact that railroads are not exempted from the social security bill, now in conference, Senator Wagner, who attended the hearing part of the time, said there was no intention to have the railroads included under both bills. "Then why select the railroads for further burdensome treatment and experimentation?" asked Judge Fletcher. He said he was amused at Mr. Ekern's "naive statement" that pensions would not cost the railroads anything because they would be charged to operating expenses, because some railroads have the greatest difficulty in earning their operating expenses now and it would probably be impossible to pass on the increased expense in the form of rates. Judge Fletcher said he believed the time would come when the question of retirement allowances can be worked out amicably between the railroads and their employees.

C. A. Miller, general counsel of the American Short Line Railroad Association, said the plan was clearly beyond the constitutional power of Congress to enact and that the cost would impose such an intolerable burden upon the member lines of the association as to "put it beyond the pale of sound transportation economics." "Whatever may be the good intentions accompanying it, and whatever may be the views of the short lines with respect to the bill as a social measure," he said, "they are wholly unable to pay the cost which it entails. As nearly as can be determined, if the proposed bills became law and were sustained by the Supreme Court of the United States, the additional cost of operation imposed on these short lines would result in about 67 per cent of them failing to earn operating expenses and taxes, and about 80 per cent of them failing to earn their fixed charges.

"You have before you a bill which is *prima facie* unconstitutional. I do not believe that there is any lawyer thoroughly familiar with the decisions of the Supreme Court of the United States who would give a professional opinion that this bill is constitutional. There seems to be a feeling in some quarters that Congress has no duty to perform in such cases but to pass the bill and let the courts determine its constitutionality. It is our view that any member of Congress who pursues

(*Continued on page 90*)

The Role of Metals in the Railway Industry*

An appraisal of some of the problems involved in the application of new high-tensile materials for lighter weight railroad equipment

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LONG before the railroads became concerned with the proper use of proper materials, they were confronted with a shop problem. Standardization of track gage in 1886 meant interchange of rolling equipment. It also meant that cars must be made serviceable in shops, not necessarily on the home line. This factor has had much to do with the shaping of railway equipment standards. It still has, and rightfully so.

Railway engineers are not unsympathetic to progress; they simply dare not defy the many inhibiting factors peculiar to railroad operation. It is all well and good to upset convention, but when, by so doing, the result leads to nation-wide confusion, the accomplishment is of doubtful worth. With this in mind, it becomes understandable how such simple materials as malleable, cast steel and structural shapes can persist in the face of more valuable metals. They are universally available and require no such special technique of application as would heat-treatable alloys.

We must further understand that until recently railroad management has been indifferent to weight excesses, so long as equipment has complied with its ideas as to maintenance, safety and serviceable life. In this respect, railroad engineers have built even better than they knew. Over 60 per cent of available locomotives today are over 20 years old. Coaches built for a useful life of 20 years are still running after 25. The supposedly obsolete wooden passenger cars have not yet been fully retired and were it not for wrecks, freight equipment would seemingly last forever. Just what the price has been that is chargeable to continued operation of obsolete and excessively heavy equipment will never be known. We only know that conditions have changed. The business offered is no longer so good as to be profitable, regardless of the plant engaged by it. Unfortunately, while business quickly adapts itself to changed conditions, the railroads have created for themselves, or had imposed upon them, a large and unwieldy structure of finance, organization and equipment. A change here will be slow and deliberate, but it will come, for the railroad is fundamentally still the ideal carrier of goods and people.

Freight Revenue Based on Net Weight, Cost on Gross Weight

Ever since transportation became a commercial venture, the basis of revenue as well as cost of operation has always been figured on weight. The carrier naturally only gets paid for the weight of the cargo offered for shipment. He pays, however, for the movement of both cargo and vehicle. It is to his interest, then, to maintain a reasonable relation between the weights of each. Just how far our railroads have departed from this sound premise has been the subject matter of many surveys and reports—most of them dated since 1929. It is true, however, that freight revenue is still calculated on the basis of weight, but how? There are over 5,000 different freight classifications and few of the distinctions bear any relation to cost of service. But, even under the most ideal conditions we find, for instance, that one ton-mile of train movement is required for every one ton-mile of coal hauled. The proportion for other classifications is even less favorable.

In passenger service, the preponderance of equipment weight is tremendous. However, passengers pay by the head and not the pound, so it is, perhaps, only fair to figure train weight per person. This varies from two to ten ton-miles for every passenger-mile.

Obviously something has got to be done to rehabilitate the railroads. They have got to be reorganized on the basis of carrying goods rather than encumbered by the methods of doing business. The traffic must be analyzed for simplification of movement and for the type of equipment best suited to make that movement. Much old rolling stock is still economically usable. New equipment should be considered, first, for those services where the old is obviously unsuited, and second, where new business may be attracted. Only a few railroads in America make money on passenger business, and it is here that a beginning has been made. Light-weight trains make for reduced operating cost, on the one hand, while speed with its concomitant streamlining are calculated to attract new business.

But, above all, weight reduction is the order of the day. Weight reduction, however, does not fit into the railroad man's picture of safety and endurance. The feeling that "weight is strength" is of too long standing to be readily argued away. Past failures have been too often corrected by use of more metal to inspire confidence in any reduction. These seemingly irreconcilable desires of a reduced weight and an even better endurance, have been finally adjusted through introduction of what we may call light-weight construction.

Light-Weight Construction

Light-weight construction may be defined as a more efficient use of a more efficient material. An I-beam, for instance, may represent a fairly poor use of mild steel, especially when compared to a highly efficient

* Abstract of a paper presented before the American Society for Metals, New York, May 24, 1935.

girder where this same material is uniformly stressed to its working limit. Substituting a high-tensile steel having three times the strength into the I-beam may increase the strength of that beam by three, but if built instead into the girder, this may then be conceivably six times as strong as the original I-section. Such is the spirit of light-weight construction. One well built girder uses the same weight of material as does the conventional section, but replaces six of them.

Interpreted into car building, this works out about as follows. The roof and floor are indispensable members, anyhow, and so why not use them as top and bottom chords of a beam? All that is required is to organize the equally necessary side walls into shear members. Contrasting to this is the conventional railway coach which is built up on heavy center and side sills with the walls below the windows acting in support. The roof being insufficiently attached against horizontal shear, merely acts as a separate stiffening member, but does not become an integral part of the structure as a whole. In other words, the mild steel constituting the car structure has not been used to best advantage.

Selection of Materials

Having decided upon a better utilization of material, the next step involves selection of that material. This is more difficult. Two metals suggest themselves; aluminum alloys and high-tensile stainless steel. Both balance out in any strength to weight comparison. With a weight ratio of approximately three to one, ultimate strength, yield point and modulus of elasticity show a ratio of one to three. Furthermore the cost per pound is also about the same, namely about 35 cents. Decision between these two dissimilar types of metals will rest upon conditions other than those of structural equivalents. Methods of design, endurance, shop practice and even prejudice will be determining.

More aggravating is the question as to whether or not either of these materials can be economically justified. There are cases where no other material serves the purpose, and then again, there are cases where use of these alloys is simply a wasteful procedure. In between lies a border zone of highly debatable application. This zone is being narrowed from the bottom by a new series of low-alloy steels and from the top by cheaper applications of aluminum and stainless steel. The price differential between 5 cents for the former and 35 cents for the latter would seem to make decision obvious, but such are the newly recognized economics of weight that base prices may become a fallacious indicator.

With the premise granted that rolling equipment must be lighter and yet unreduced in either endurance or factor of safety, both a new design and superior materials are automatically indicated. The cost and extent of the lightening will be balanced against expectant savings in operation. The arithmetic of it is really quite simple, which accounts, perhaps for the numerous and, often, discordant answers obtained.

Less simple but far more definite is the structural analysis. It proceeds on the basis that a passenger coach, for instance, is made up of one-third by weight of car body; one-third by appointments, and one-third by trucks. Reduction of appointment weight permits a reduction of body structure, and this, in turn, permits a still further structural reduction. The eventual weights of body and appointments determine the truck loading and hence also its weight.

As beneficial as is this cycle of weight reduction, it is well, however, to bear in mind that it can be just as vicious if taken in reverse. Every pound added to a structure adds just so much to structural requirement.

The Freight-Car Problem

Freight cars contribute a much larger proportion of railway movement than do passenger cars, and while they particularly invite reduction of weight, there are other considerations which decidedly limit the cost at which this can be accomplished. In the first place, a freight car rarely remains on the home line. When off it, the homeline receives a flat rental of one dollar a day. When requiring repair, the home line is billed for it. There is, in consequence, little incentive to reduce cost of haulage at the expense of a higher first cost, but there is a great incentive toward a lowered liability to damage. Freight cars are, after all, largely storehouses. They roll only a small percentage of their life and in the meantime are exposed to the rough usage of loading, unloading and handling.

Accordingly, the problem is one of increased durability with little or no increase of weight, and certainly at a low first cost. Here, the newer alloyed steels offer promise. Less favorable, however, is the hope of great saving through improved design, for freight cars already represent a pretty efficient use of the material employed. They average about one pound of car to three pounds of load, as contrasted to passenger coaches which rate some 13 or 14 lb. of car for every pound of passenger.

In between the extremes of high-speed, streamlined trains and freight cars, lies a large field of rolling equipment where the economic answers are not only more difficult but where the relation between first cost and expectant performance leave an uncertain basis from which to proceed. The issue will probably be drawn on the question of conventional type passenger coaches intended for use behind existing locomotives. The full significance of weight, here, has not yet been fully appreciated, but it will be.

The Evaluation of Materials

When metals were evaluated by that trinity of physical properties known as tensile strength, elastic limit and elongation, things were quit simple but insufficient. Since, then, impact, fatigue and other characteristics have been given comparative values. In fact, the items listed under the heading of "physical properties" are today so extensive that they confuse rather than facilitate comparison.

Far more significant, but by the same token, far more difficult to reduce to formula is the question of comparative application. Theoretically, one can build just as lightly and just as strongly in spruce, aluminum alloy, or stainless steel. Practically, there may be decided reasons for the preference of one over the other two. In any case, the design will be quite different.

These three dissimilar materials vary primarily in bulk and method of joining. Bulk makes for sectional stability in any structural member, while the efficiency of joining determines the degree to which these members may be evaluated in a complete structure. While bulk favors the lightest material, the problem of joining favors the heaviest. However, the stabilizing effect of bulk can be simulated through the design of built-up sections and, if joining is simple and effective, both advantages stand combined in the one material, namely steel.

Translated into equivalent structures, we find respectively a wooden plank on edge, an aluminum I-beam and a fabricated box girder of steel. The attachment of these into a structure is again respectively by bolts,

rivets or welding. Comparative efficiencies of these joints as related to the members themselves approximate some 30, 60 and 80 per cent.

The joining of materials is among the oldest crafts and is still a problem to tax our ingenuity. Not until recent years has any new thought been introduced and that relates not so much to joining as it does to making the material pieces continuous by welding. Of course, fire welding is an ancient art, but welding in place rather than at the forge is a new development. The moment that welding becomes portable, it is in a position to compete with riveting. However, welding, unlike riveting, has a heat effect on the metal and this is to be reckoned with. Since heat effect is inherent, the welding cannot be accommodated to the material. The material must be accommodated to the welding. Some metals are, therefore, not adaptable to the process at all, while others show varying degrees of adaptability. This characteristic is apt to be far more determining today than other physical properties. In other words, one selects from among the weldable metals that which has the highest physicals.

Strangely enough it is cold-rolled stainless steel again which combines the greatest strength, the greatest toughness and the highest degree of weldability. It is not, however, generally weldable. Arc or gas welding may impair its metallurgy and will certainly destroy all beneficial effect of cold working. The "Shotweld" process alone gives an efficient weld without injurious effects to either metallurgy or cold rolling. In fact both metal and welding process appear to be complimentary to each other.

Stainless steel is a generic term and covers a number of alloys of widely different characteristics. Structurally, interest centers about the one alloy known as 18-8. When cold-rolled to 150,000 lb. per sq. in. ultimate, it reaches the happiest combination of strength, yield point and workability. The only argument advanced against it is that of cost and as this continues to reduce so will its range of application.

Almost simultaneously with the development of stainless-steel railway cars, has been a similar endeavor using aluminum alloys. As previously stated, these alloys and high-tensile steel balance out on a purely strength-weight consideration. Where differences occur in the final result, these can be attributed to differences of design aim and technique of application. The bulkiness of the lighter alloys invite skin-stressed car structures, while with thin steel, the tendency is toward trussed members. A further appeal in the use of aluminum is that substantial weight reduction is had without departure from conventionally rolled sections, and assembly is still by rivets. In other words, shop practice need not be greatly disturbed.

Regardless, however, of whether or not the aluminum alloys are used for the basic car structure, these do play an important part in all schedules for weight reduction. The amount of aluminum used in train appointments and apparatus forms an amazing proportion of the total equipment load. But, here, again, enters the question of base price. In this respect aluminum alloys and stainless steel remain about equal.

Out of this cost argument has come a series of low-alloy steels which, while falling far short of the properties of stainless, still represent a considerable advancement over plain carbon steel. Most significant among the properties of these newer steels is an elastic limit of some 54,000 lb. per sq. in. and a good degree of weldability, especially by the arc process. These steels have already enjoyed a wide application in the railway equipment field. The technique of their use has introduced new problems into the car shops. This is inevitable for one does not turn lightly from riveting to welding. The highly localized heat is apt to provoke warping or other disturbances and the training of good welders is still another problem.

However, regardless of the means, the demand for reduced weight of rolling equipment is clearly defined. With that demand will come a better appreciation of the economic role of metals. We will never know the toll which excess weight has enacted in the past, but we will know what light-weight construction does promise for the future.

Originally, desire lagged for lack of the materials of expression and progress was slow. Today, however, the metallurgists must find keen satisfaction in not only having met, but in actually having anticipated every new demand. In fact, so well has the metallurgist done, that he finds industry somewhat confused by too wide a choice of materials. This leads to discussion, prejudice and often arbitrary decisions, but out of it all will come a betterment. The role of metals will again have been that of economic rescue.

Rail Output in 1934 Shows Substantial Increase

THE production of rails in the United States in 1934 totalled 1,010,224 tons, an increase of 593,928 tons, or 143 per cent, as compared with 1933, and 607,658 tons, or 151 per cent, as compared with 1932, according to figures released by the American Iron and Steel Institute. While these increases are substantial, the tonnage for 1934 is still considerably below the level of rollings that prevailed in the years before the depression and compared with an output of 3,217,649 tons in the peak year of 1926.

Production of Rails by Processes, Gross Tons, 1920-1934

Year	Open-hearth: Rolled from ingots	Open-hearth: Rolled from new seconds, etc.	Bessemer and Electric	Rolled from old rails	Total	Included in total: Girder and H tee	Included in total: Alloy
1920	2,312,750	21,472	143,196	126,698	2,604,116	100,910	12,909
1921	2,019,988	7,227	55,564	96,039	2,178,818	89,162	6,276
1922	2,032,004	996	22,317	116,459	2,171,776	128,878	3,163
1923	2,721,578	17,201	25,995	139,742	2,904,516	130,056	2,142
1924	2,295,755	11,778	16,069	109,730	2,433,332	85,533	5,167
1925	2,678,536	13,287	9,687	83,747	2,785,257	98,620	4,009
1926	3,098,776	9,216	12,533	97,124	3,217,649	116,374	4,216
1927	2,712,287	5,578	1,566	87,055	2,806,486	99,621	1,265
1928	2,573,608	6,533	3,156	64,196	2,647,493	113,150	6,453
1929	2,651,397	10,766	4,209	55,766	2,722,138	109,678	1,965
1930	1,829,143	5,790	2,182	36,118	1,873,233	69,814	4,687
1931	1,132,433	3,118	828	21,372	1,157,751	44,652	533
1932	390,816	2,198	64	9,488	402,566	29,003	565
1933	388,420	9,372	300	18,204	416,296	17,561	437
1934	970,428	11,645	2,032	26,119	1,010,224	29,988	1,598

The production of rails in 1934 was marked by an increase of 337,635 tons, or 220 per cent, in the output of rails weighing 100 lb. and less than 120 lb. per yd., although those weighing 120 lb. per yd. and over showed an increase of 200,960 tons, or 128 per cent. Together, the increase in these classifications accounted for 538,595 tons of the total increase of 593,928 tons. A new feature inaugurated with this year's compilation is the segregation of the tonnage of rails weighing 136 lb. per yd. and over into a separate column in the table showing the production of rails by weights, this figure for 1934 amounting to 31,805 tons.

The production of rails rolled from old rails amounted

to 26,119 tons as compared with 18,204 tons in 1933, while the combined output of Bessemer and electric rails totaled 2,032 tons as against 300 tons in the previous year. A substantial increase also took place in the quantity of alloy-treated rails produced, the amount being 1,598 tons in 1934, as compared with 437 tons in 1933.

The production of rail joints and tie plates in the United States in 1934 totaled 333,650 tons, an increase of 146,852 tons, or 79 per cent, as compared with 1933, and an increase of 190,097 tons, or 133 per cent, as compared with 1932, according to figures compiled by the American Iron & Steel Institute. The output of tie plates alone amounted to 250,447 tons, as compared with 142,414 tons in 1933, an increase of 76 per cent, and 109,666 tons in 1932, an increase of 128 per cent. The production of angle splice bars was 65,714 tons in 1934, as compared with 33,307 tons in 1933; the output of fish plates was 2,298 tons, as compared with 3,000 tons; and the production of other rail joints was 15,191 tons, as compared with 8,077 tons.

Production of Rails by Weights Per Yard, Gross Tons, 1920-1934

Year	Under 50	50 and less than 85	85 and less than 100	100 and less than 120	120 and less than 136	136 and over	Total
1920	489,043	433,333	952,622		729,118		2,604,116
1921	211,568	214,936	902,748		849,566		2,178,818
1922	265,541	274,731	728,604		902,900		2,171,776
1923	272,794	300,907	864,965		1,465,850		2,904,516
1924	191,046	213,274	853,431		1,175,581		2,433,332
1925	163,607	219,648	765,371		1,636,631		2,785,257
1926	197,260	256,287	797,662		1,966,440		3,217,649
1927	161,836	173,257	539,445	1,314,424	617,524		2,806,486
1928	134,197	125,726	465,393	1,203,749	718,428		2,647,493
1929	141,362	102,944	409,628	1,233,599	834,605		2,722,138
1930	95,626	81,299	267,879	835,496	592,933		1,873,233
1931	50,089	25,524	123,398	495,752	462,988		1,157,751
1932	16,655	13,705	28,593	215,091	128,522		402,566
1933	*49,116	†15,413	40,973	154,007	156,787		416,296
1934	*70,085	†17,111	73,639	491,642	325,942	31,805	1,010,224

* Under 60 pounds per yard. † 60 and less than 85 pounds per yard.

Rival Groups Demand Pension Law

(*Continued from page 86*)

such a course, and who votes for a bill that he fairly believes to be unconstitutional, violates his oath of office."

Murray Latimer, who was chairman of the Railroad Retirement Board created under the old act, gave a statistical statement as to the cost of the pension plan, based in part on information collected for the report which Co-ordinator Eastman is to make public in the near future, estimating the pension payments for the year 1936 at $59,000,000 and a gradual increase to $259,000,000 in 1965.

Before the House committee on July 17, Dr. Julius H. Parmelee, director of the Bureau of Railway Economics, presented estimates that the annuities provided for in the bill as introduced would amount to $80,441,000 in 1935, $128,776,000 in 1940, $171,852,000 in 1944, and in 25 or 30 years would reach a total of about $350,000,000 a year. He also said that to pay to termination the annuities proposed for employees to be retired in the first year would cost a total of about $800,000,000.

Charles R. Seal, representing the National Industrial Traffic League, opposed the bill on the ground of the great expense that would be imposed on the railroads, which he said would impair their ability to furnish proper service.

Odds and Ends . . .

Diamond Jubilee

The Sandy Hook steamship line of the Central of New Jersey celebrated its 75th anniversary recently. This line was begun by the railroad just before the Civil War and played an important part in troop transport during that struggle.

Trousers for Railroaders

Women car cleaners on the New York, New Haven & Hartford have won the right to wear trousers at work, or at least knickers. A sensible move it is, too, tending toward greater safety than awkward skirts that catch everywhere.

Bi-Lingual

Unless some of the Maine railroads have signs in both French and English for the benefit of the French-Canadians living there, the town of Florence, Kan., on the Santa Fe, is probably the farthest east bilingual town. The signs about the station buildings there are in both English and Spanish, the latter, probably, for the guidance of the numerous Mexican section laborers.

Gates on the Right of Way

Various lines have gates on the right of way at certain crossings at grade with other railroads, but the San Diego & Arizona is probably unique in having a huge gate in a strong fence across its main line where there is no other railroad to cross. This is at the border near the Tijuana station, where the line re-enters the United States after a dip down into Old Mexico.

Railroad-Astronomer

E. F. McPike, superintendent of perishable freight service of the Illinois Central, Chicago, has just been elected to membership in the British Astronomical Association in recognition of his original researches into the history of science in the time of Sir Isaac Newton, Edmond Halley and their contemporaries, who were leaders of world thought in the latter part of the seventeenth century and early part of the eighteenth.

Coincidence

C. & O. 43256 was loaded with coal at Estill, Ky., for a customer in Anderson, Ind. Thirty-nine days later the same car was loaded by the same company with the same kind of coal for the same customer. Meanwhile, the car had been busy, having made five trips in other directions. Those who have mathematical minds may want to figure the chances, based on the C. & O. ownership of about 45,000 cars for handling coal.

Furry Hobo

A rod-riding cat was recently removed from the frame of one of the car trucks on Delaware & Hudson train 308 on its arrival at Oneonta, N. Y. Where the apparently well-bred Angora boarded the train and how it managed to cling to its precarious position will probably never be learned. Removed by a car inspector, the cat was taken to the local police station and fed, after which it curled up and went to sleep, completely disinterested in the officials' attempts to locate its owner.

Accident No One Noticed

Henry Frost, a farmer living near Hazen, N. D., drove his auto and trailer across the Northern Pacific tracks at that place recently at about the time a train passed. Neither Henry nor the train crew were aware that anything out of the ordinary had happened. When, however, the train reached the coal dock, the crew found the trailer's wheels draped over the locomotive pilot, and Henry, on arriving home, found his trailer missing. Henry and the crew thereupon put their heads together and decided that Henry had not quite beaten the train to the crossing after all.

NEWS

Water-Competitive Rates on Autos Denied by I. C. C.

An application by the transcontinental railroads for authority to establish and maintain reduced rates on automobiles and parts from eastern points to California points to meet water competition via the Panama canal without observing the long-and-short-haul provision of Section 4 of the interstate commerce act was denied by the Interstate Commerce Commission in a report made public on July 16 on the ground that the applicants had not met the burden upon them to show with reasonable certainty that the traffic which would probably move under the proposed rates would produce increased net revenues. Commissioner Mahaffie, dissenting, said that in his opinion the record warranted granting much of the relief sought; that a great volume of the automobile traffic has been lost to unregulated carriers, and that he would give greater weight to the applicants' testimony as to the revenue effects of the reduction than the majority had. Conclusive proof on such a question, he said, is always difficult, if not impossible. The majority said in part:

"Applicants assume a total annual movement of automobiles to California of 109,000 tons, which is the average for the years 1929 to 1932 and is substantially the movement in 1930. Of this volume 40 per cent, 43,600 tons, was taken as what the rails might retain for a time at present rates. The proposed rates would average $3.90, a reduction of 75 cents under the present rate of $4.65. Based on these assumptions and the out-of-pocket cost of $1.41 used by applicants as the cost of hauling the added traffic, a 12.5 per cent increase in rail traffic, at the reduced rates, would cause a reduction in carrier income of $382,590 a year for the lines hauling the traffic westward. A 25 per cent increase in traffic would on the same basis reduce the income by $111,180. An increase of 30.12 per cent in traffic would make the increase in revenue exactly equal to the increased expense. A 50 per cent increase in traffic would result in a net gain of $431,640.

"This computation takes no account of the loss to eastern carriers from having the traffic diverted to the westward rail movement. A 50 per cent increase in all-rail traffic would cause the diversion of 21,800 tons from the eastern lines. On this amount they would lose $547,400 in gross revenues, but would save some out-of-pocket expense. Taking this into account there would be a net loss in income to the eastern lines not far from the gain to the western lines even if the effect of the reduced rates were to divert as much as 50 per cent of existing traffic to the westbound rail movement. Furthermore, these figures give no consideration to the probable trend back to the rails as renewed business activity returns and as the tendency to reduce transportation costs to the minimum is replaced by a demand for the best and most convenient and expeditious service.

"The possibility of further reductions in the rail-water rates must not be overlooked. The authority sought by applicants contemplates a possible reduction of the all-rail rates to $2.25, to meet that contingency. At that rate the rail traffic would have to be more than doubled before the gross revenues would even equal those from 40 per cent of an annual movement of 190,000 tons at the present rates, and would have to be increased 285 per cent to yield enough additional gross revenue to equal the additional out-of-pocket cost, without considering the loss to the eastern lines or the loss from further reductions of intermediate rates by reason of lower combinations on the terminals."

New Secretary for British Railway Clearing House

Ernest Edward Painter has been appointed secretary to the Railway Clearing House in Great Britain to succeed the late P. H. Price. Mr. Painter has been in the service of the Clearing House since 1890.

Power Reverse Gear Case Assigned for Further Hearing

The Interstate Commerce Commission has assigned the power reverse gear case, in which its order requiring the railroads to equip their locomotives with power reverse gear was set aside by the courts, for hearing at Washington on September 17 before Examiner Rogers.

Cattle Well-Cared For

The Norfolk & Western has received a certificate of merit for an outstanding record based on its transporting 1,922 carloads of livestock in Ohio, in the year 1934, on which loss and damage claims amounted to only an average of 26 cents a car. This is 10 cents less than the record in 1933, and compares with records for the railroads of the country, as a whole, in 1934, of 90 cents a car, and in 1933, of 68 cents a car. The certificate is granted by the Livestock Loss Prevention Association of Ohio, which certifies that the 32 stock pens, maintained by the railroad at shipping points in Ohio, have every facility for efficient operation. The road operates 1200 stock cars.

Railway Service Resumed After New York Floods

Railroads affected by the July 7-9 floods in central New York State were at work last week repairing their damaged roadbeds and restoring their train services through the flooded areas. By Sunday, July 14, practically all suspended and detoured train services had been restored to their normal routes, although much work remains to be done before the lines are completely rehabilitated.

The Lehigh Valley's main line between Odessa, and Kendaia and four of its branches were affected but this road had one of its main-line tracks open for through service to Buffalo by late afternoon on July 9. Its branch lines where bridges were damaged were all opened by the end of the week. Meanwhile, the Lehigh detoured some D. L. & W. trains and others of the New York Central's Pennsylvania division on which latter a viaduct was destroyed at Watkins Glen.

Approximately 40 miles of the Erie's main line between Corning and Hornell were affected. At 6 p. m. on July 9 one track on this stretch was open while trains were operating in and out of Hornell on the Buffalo division at 4:30 p. m. on July 8. The second track of the main line between Hornell and Corning was open at 6 p. m. on July 11. On the Rochester division the line between Painted Post and Wallace was damaged but was restored to service on July 17. The nine-mile Bath-Hammondsport branch is still out of service. On the Allegheny division the main passenger line for some distance west of Hornell was affected until 6 p. m. on July 12. Some Erie trains were routed over the West Shore and others detoured over the Pennsylvania, while the Erie meanwhile detoured some D. L. & W. trains and some New York Central freight trains because of the latter's damage at Watkins Glen.

The Delaware, Lackawanna & Western's main line to Buffalo was affected between Painted Post and Kanona by several washouts and damage to bridges. It's Syracuse and Utica divisions and Ithaca and Cincinnatus branches were also damaged. The main line to Buffalo was opened at 11:30 a. m. on July 14 while the Syracuse division and Ithaca branch were opened the previous forenoon. The Cincinnatus branch was opened at 9:30 a. m. on July 15 and the Utica division at 1:00 p. m. on the same day.

Operation of trains over the main line of the New York Central between New York and Buffalo was not affected by the storms and floods. A washout near Randall, on the West Shore about halfway between Albany and Utica, impeded freight

operation there temporarily until repairs could be made. This is a freight line only. One of the tracks at this point was put in operation on the night of July 9 and the second track the next day. On the Pennsylvania division, as stated above, the Watkins Glen viaduct was destroyed and through operation over this division cannot be resumed until the viaduct is repaired. The road estimates that it will take two or three weeks to make the repairs. There were also some washouts on the St. Lawrence division, which have all been repaired. Train movements on the Delaware & Hudson were interrupted for five days, at Sidney, where two 150-ft. truss spans carrying the northbound tracks, were carried away and two similar spans carrying the southbound tracks were damaged.

I. C. C. to Investigate Kansas State Rates

On petition of the railroads the Interstate Commerce Commission has ordered an investigation as to the failure of the State Corporation Commission of Kansas to authorize or permit for intrastate application on certain commodities emergency charges similar to those authorized by the federal commission for interstate traffic.

Another Stop Added to Schedule of "400"

The "400" of the Chicago & North Western, on July 15, added another stop, South Beaver Dam, Wis., to its schedule, thereby increasing the number to four, including Milwaukee, Adams and Eau Claire. Northbound, the train stops at South Beaver Dam at 3:30 p.m., while southbound, it stops there at 7:42 p.m.

New York-Boston Trains Faster

The New York, New Haven & Hartford's principal trains between New York and Boston will henceforth run through in five hours, which, up to a few years ago, was the schedule for the two fastest trains. The Yankee Clipper and the Merchants' Limited now run through each way in 4 hr. 30 min. Eleven trains between New York and Springfield are to have their schedules shortened from five to ten minutes each.

Correction

In the *Railway Age* of July 13 it was stated that one of the Twin Zephyrs was taken out of service for two days when a roller bearing on the front truck burned out. More specifically, the bearing which failed supports the driving motor armature shaft which transmits power to the wheels of the front truck.

Mid-West Shippers' Board

Car requirements for the third quarter of 1935 in Illinois, Iowa, Wisconsin and western Indiana will be the same or a trifle larger than during the same quarter in 1934, according to committee reports submitted at a meeting of the Mid-West Shippers' Advisory Board at Chicago on July 11. Increases in shipments are expected for agricultural implements, automobiles and trucks, bricks and clay products, canned food, dairy products, fertilizers, fresh fruits and vegetables, hay, machinery, sand, gravel and stone, and paper.

Findings of the Interstate Commerce Commission in the car spotting decision Ex Parte 104, Part 2, were discussed at the meeting by John S. Burchmore. M. J. Gormley, executive assistant of the Association of American Railroads, outlined the developments and activities of that association.

Revised Western Trunk Line Class Rates Become Effective August 20

New tariffs, including revisions which in general provide reductions from present levels of rates for short hauls and graduated increases for long hauls, will become effective in Western Trunk Line territory about August 20. The new rates will apply within the Western Trunk Line territory and from Western Trunk Line points to points within Central Freight Association, Eastern Trunk Line and New England territories.

Special Safety Car on the Alton

The safety, freight claim and fire prevention department of the Alton is operating a special car over the system in the interest of these phases of railroad education. The car, which has space for carrying all necessary equipment, including a stereopticon, slides, posters, slogans, charts and photographs, is equipped with leather upholstered chairs, and can seat 65 persons. At the front end of the car a canvas screen 4 ft. by 5 ft. is suspended from the ceiling on which the stereopticon pictures are projected. Photographs of men at work in various departments are shown on slides. New pictures are taken as the car moves over the road and employees look forward to its return so that they may see themselves or fellow workers on the screen.

The car is handled on the rear of local freight trains and is set out every 20 or 30 miles for the holding of meetings for employees, mostly maintenance of way men.

During Railroad Week the car was on exhibition at Springfield, Ill., and Jacksonville, where it was visited by about 10,000 persons. The operation of the car has aroused interest along the line and several industries employing large numbers of people have asked permission to have their employees go through the car; and in one case, a request for a special meeting in the car, for the benefit of an industry's employees, was granted.

Coach and Tourist Car Train Becomes Second Section of Los Angeles Limited

A new train, composed entirely of day coaches and tourist sleeping cars, is now being operated by the Union Pacific between Omaha, Neb., and Los Angeles, Cal., as a second section of the Los Angeles Limited, the first run being made from Los Angeles on July 11 and from Omaha on July 12. With the addition of this train, which also handles the coaches and tourist sleeping cars of the Portland Rose between Green River, Wyo., and Omaha, the Los Angeles Limited becomes an all Pullman train. The coach train carries its own diner which features low cost meals and a special car for women and children. Pillows and drinking cups are being furnished free on the train. All cars are air-conditioned.

Repeal of Long-and-Short-Haul Clause Favored by House Committee

A favorable report on the Pettengill bill, H. R. 3263, to repeal the long-and-short-haul clause of the fourth section of the interstate commerce act was ordered by the House committee on interstate and foreign commerce at a meeting on July 16, follow-

Instruction Car for Teaching Safety

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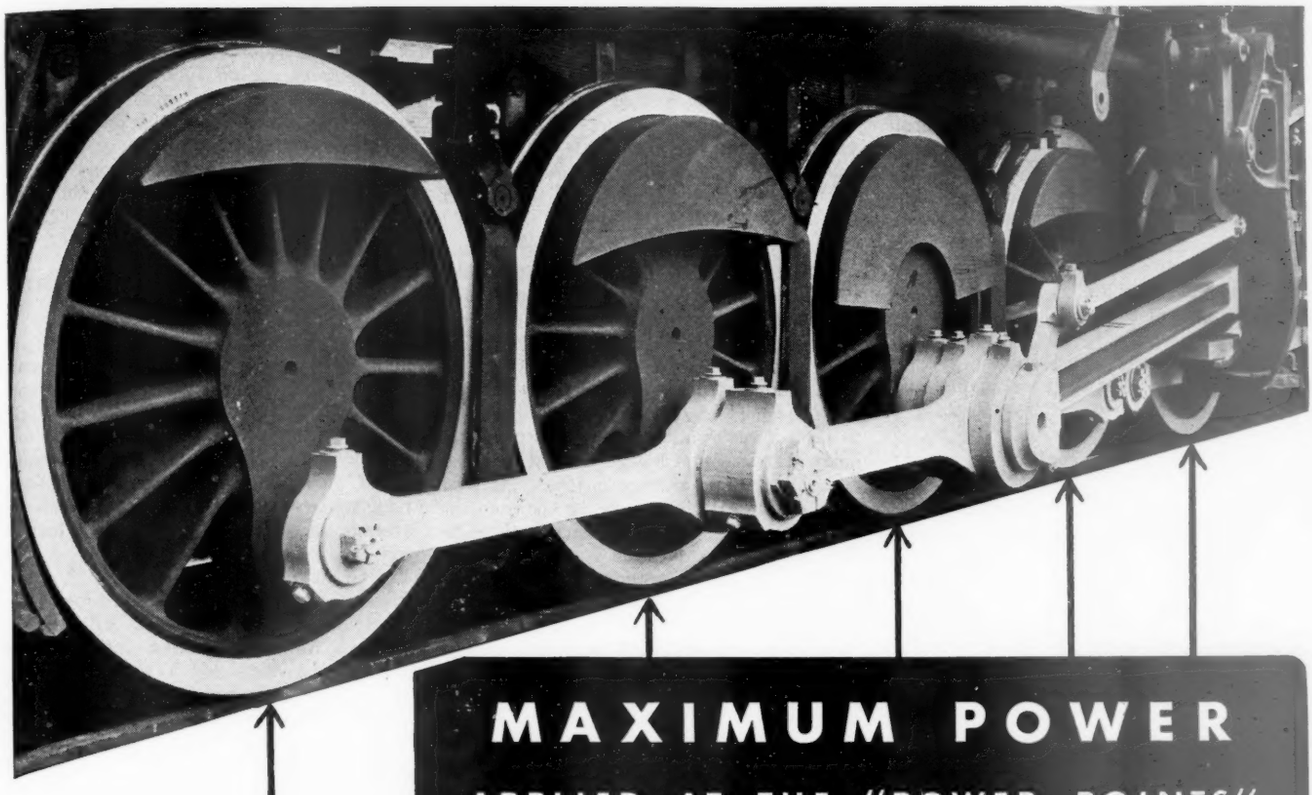

MAXIMUM POWER

APPLIED AT THE "POWER POINTS"

Makes Money

The job of the locomotive designer is to apply the maximum possible horsepower to the "power points". » » » How well he is succeeding is shown by the 1200 horsepower per axle of modern locomotives compared with the 600 horsepower per axle of locomotives ten years old and over. » » » Doubling the power at the "power points", doubles the drawbar horsepower. » » » Doubling the drawbar horsepower, doubles the net ton-miles per mile of track per day — the true measure of the productiveness of the transportation plant.

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ing consideration for several days of a report from a sub-committee which held extensive hearings on the bill. To meet various objections that had been made by opponents of the bill at the hearings the committee proposed an amendment, which had been recommended by the sub-committee, to place the burden of proof upon the railroads to show that reduced rates proposed to meet carrier competition are reasonable and non-discriminatory. The amendment provides that in any case where there is brought in issue a lower rate for a longer than for a shorter distance over the same line or route in the same direction, the shorter being included within the longer distance, "the burden of proof shall be upon the carrier to justify the rate or charge for the longer distance against any claim of a violation of Sections 1, 2, or 3 of this act."

Western Advertising Campaign Successful

The advertising campaign of the western railroads was characterized as an unqualified success in a report of the committee in charge of advertising submitted at a meeting of the Western Association of Railway Executives on July 9. "While the campaign is ended," said the report, "the results and benefits continue to accumulate and we confidently believe that benefits will continue to accrue for several months. Passenger traffic on the western railroads showed increases this year over last substantially higher than increases on eastern railroads. Because the committee used existing facilities of the railroads for detailed mechanical work, economies were made, reducing the cost of the campaign from the budget of $440,000 to $367,944 without sacrificing the effectiveness of the campaign." The committee recommended that in view of the unquestioned success of this first and (so far) only major effort of this kind, steps be taken immediately to determine if similar efforts should be continued and if so, in what way and to what extent. The recommendation was taken under advisement and will be considered at a meeting in Chicago on September 6.

Hiawatha in Two Sections

In order to meet demands for accommodations on the Hiawatha, the Chicago, Milwaukee, St. Paul & Pacific is now running a second section on days when traffic is heavy. Since the latter part of June, this second section has been operated each week-end; also on July 3 and on several other days. While the train is run out of Chicago as a second section of the Hiawatha, its main purpose is to accommodate intermediate business and passengers to the North Woods of Wisconsin.

It is operated on the same schedule as the Hiawatha from Chicago to New Lisbon, Wis., from which point it runs as a section of train No. 105 to Minocqua, Wis., where it arrives at 9 p.m., 30 min. ahead of the regular 105. It carries passengers from Milwaukee, Portage, New Lisbon and places between the latter point and Minocqua. Returning, the train is deadheaded from Minocqua to LaCrosse, where it is turned and then runs to Chicago as the second section of the Hiawatha, taking on passengers at La Crosse, New Lisbon, Portage and Milwaukee.

The train includes a solarium parlor car and a dining car, both of which, with the coaches, are air-conditioned, and is pulled by a Pacific locomotive which has been converted into an oil burner and painted yellow.

New Type Express Car to Compete with Trucks

The use of a new type express car and improved express car service from the northern part of Wisconsin to Chicago and Milwaukee, in an effort to recapture veal shipments from truck competition, is being tried on the Chicago & North Western. This refrigerated car is the first to be used for shipments of this kind and is designed to protect veal while being moved from the dairy districts to Chicago and Milwaukee and insure top market prices. At the present time, the car is being operated on a circuit, leaving Appleton Junction through Eland and then to Green Bay, picking up veal enroute and permitting the consolidation of veal shipments from the Rhinelander, Wausau and Stratford districts at Eland and from the Laona Line at Green Bay.

Hooks for 144 animals are provided in the car so that the carcasses will not be piled on top of each other. The cars carry about five tons of ice for each trip. Other perishables, such as dairy products, may also be carried in the car. Coincidentally with the experimentation with this car, the Railway Express Agency reduced rates on many perishable commodities from the dairy district of northern Wisconsin to Chicago and Milwaukee. During the first short period of operation, this new car has created some business from the territory that was not, up to this time, moving by rail.

Bus-Truck Bill Referred to New Sub-Committee

Consideration of the bill for the regulation of interstate bus and truck transportation was begun anew on July 12 by the House committee on interstate and foreign commerce, which had left the bill in the hands of a sub-committee headed by Representative Huddleston during the many weeks the main committee was occupied with the utility bill. As a first step the committee voted 11 to 8 against the bill reported by the Huddleston sub-committee, which was based on the theory of as little regulation of highway transportation as possible and contained no provision for regulation of truck rates, and decided to take up on July 15 the bill passed by the Senate. On Monday the committee referred the Senate bill to another sub-committee which did not include Mr. Huddleston. It was understood that there was considerable discussion in the committee as to whether to amend the Huddleston bill by adopting amendments to add to it, or to try to amend the Eastman bill as passed by the Senate, and that the latter plan was favored. Some suggestions have been made, however, that the only way to insure passage of the bill at this session of Congress would be to adopt the Senate bill and avoid a conference. Representative Huddleston has introduced his sub-committee bill as HR 8871.

President Roosevelt, when asked at his press conference on July 12 as to whether the bill was on his "must" list, said it would undoubtedly be an excellent thing if it were passed but he objected to the theory that he has given Congress any list of "must" bills, saying this bill should be included among those it would be "desirable" to have passed.

British Summer Schedules Bring Expedited Services

New long-distance, non-stop runs at high speeds are features of Summer passenger train schedules recently inaugurated in Great Britain by the London & North Eastern and the Great Western. The former on July 8 launched its "Scarborough Flier" on a 188.25-mi., non-stop run from King's Cross (London) to York at an average speed of 62.7 m.p.h.—"the longest run in Great Britain at over 60 m.p.h." The Great Western has made its "Cornish Riviera Express" a limited train which, from Mondays to Fridays, will operate non-stop in each direction between Paddington (London) and Truro, 279.25 mi.; on Saturdays this non-stop run from Paddington will be extended to St. Erth, 299.5 mi.

The "Scarborough Flier" will make its fast non-stop run every week-day, except Saturdays, when its London-York schedule will be 10 min. longer. It will on that day, however, be preceded by another L. N. E. train, making the non-stop London-York run, which run will also be made by Saturday through trains to points in Scotland. Also, "the fastest booked time on record" for the run—10 hr. 50 min.—is assigned to a new L. N. E. train between Aberdeen, Scotland, Edinburgh, and King's Cross.

With the establishment of the "Cornish Riviera Express" on its non-stop London-Truro run the Great Western will maintain intermediate service on the route with the "Cornish Riviera Limited" and the "Cornishman." Under the Great Western Summer schedules, the announcement states, "there are to be more 60 m.p.h. expresses, streamlined rail cars and business trains between big cities, with cross-country services and through cars to every part of the British Isles." It is pointed out that 15 G. W. R. trains now operate on 60 m.p.h. schedules, the statement adding in this connection that "the Great Western's experience in the matter of increased passenger train speeds is proving to be very similar to that of leading American railroads such as the Chicago & North Western, which opened up a new era of high-speed steam transport with its '400.'"

Report on Woodbridge (N. J.) Crossing Disaster

W. J. Patterson, director of the Bureau of Safety, Interstate Commerce Commission, has issued his report on the accident on the Perth Amboy branch of the Pennsylvania, at Woodbridge, N. J., on February 21, about 11:25 a.m., when westbound passenger train No. 711, moving at

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AIR CONDITIONING *Adds* AN EXTRA CAR TO A NORMAL TRAIN

Air conditioning is a practical necessity now for passenger satisfaction but in weight alone it is equivalent to adding approximately at least one extra car to a normal train.

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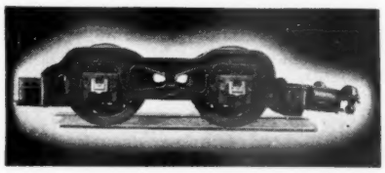
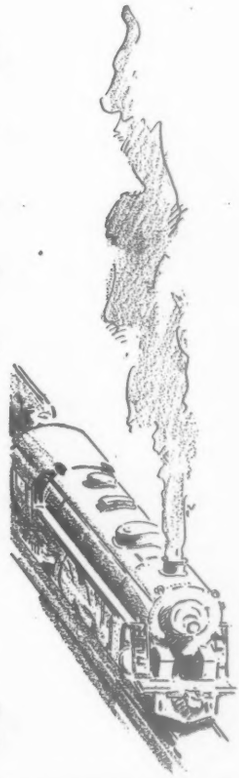
On such power, application of The Locomotive Booster provides the added power needed to smoothly start the train and quickly accelerate to road speeds. It protects the new investment.

Air conditioned trains demand extra power from the locomotive. Under all conditions the Booster is the most economical means of providing it—and the only way for existing equipment unless by another locomotive.





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NEW YORK CHICAGO MONTREAL

high speed, ran into a heavy truck, loaded with gasoline, wrecking the truck and setting fire to the train and to other property. Two employees were killed and six passengers and four other persons were injured. Included in the killed, was the watchman at the crossing, who had neglected to lower the gates; and one injured employee subsequently died. The truck (and a trailer), owned by the Shell Eastern Petroleum Products, had been stopped by the driver, B. E. Bailey, before proceeding over the crossing, and then went forward at about 5 m.p.h.; and the leading truck cleared the crossing, while the locomotive struck the trailer.

The train was not derailed and was stopped after running about 1200 ft., the locomotive and the cars being considerably damaged by fire. The flames destroyed the gateman's shanty and badly damaged the station and several parked automobiles. The engineman was killed. The watchman, whose neglect cannot be explained, had served 16 years with a good record. Witnesses had seen him in apparently normal condition an hour or two prior to the accident. The electric audible and visual annunciator in the watchman's shanty was found in good condition, and is believed to have been functioning properly. Because of the presence of a work train nearby, it is possible that the alarm for trains in the opposite direction had been sounding continuously; but nevertheless the light in the shanty should have given timely information of the approach of train 711.

The driver of the truck said that when he stopped he looked in both directions, but he did not see any train approaching until he was actually on the track; and this was in broad daylight. The report says that if he, or the mechanic who was on the seat with him, had glanced to the right, they must have seen the approaching train as there is a clear view for 1138 ft. When 30 ft. from the westbound track a driver has a view for 1998 ft.

The gasoline truck was 28 ft. 7 in. long and the trailer 26 ft. 7 in., and the gross weight of the two was about 30 tons, the total quantity of oil being 4,699 gallons.

Report on Motor Car Accident at Roseville, Calif.

W. J. Patterson, director of the Bureau of Safety, Interstate Commerce Commission, has issued his report on a collision on the Southern Pacific, near Roseville, Calif., on April 8, about 8:25 p. m., between an eastbound work train and a westbound track (motor) car, both moving at good speed; and 11 employees were killed—an assistant foreman and 10 section laborers; another assistant foreman was injured.

Because of several washouts, a number of gangs, brought together, had been working a few miles east of Roseville and, at the close of the day, the work train had gone to Roseville to have crews changed and was on its return. The track car, hauling a push-car attached as a trailer, should have kept clear of the work train. The work train consisted of 10 dump cars, loaded with gravel, and the locomotive was at the rear end.

There were several assistant foremen, some or all of them Greeks, and some of their conferences had been held in the Greek language. The cause of the collision is set down as improper supervision and lack of discipline.

There were no printed rules for the management of track cars, and one assistant foreman had allowed another one to take charge of this movement because of a disinclination to fight [to quarrel about authority].

There is a "train indicator" at the side of the road, set up for the benefit of operators of track cars, giving them information about the occupancy of the track by trains, the track cars being insulated so as not to affect the signal circuit. This train indicator has no light, but has an 8-in. face, in the lower half of which there is a hole 2 in. in diameter; and when the signal is actuated, a red disk, back of the face of the signal, drops and gives a red indication. The face of the signal is 4 ft. 2½ in. above the top of the rail. There was testimony to the effect that the assistant foreman in charge had disregarded this indicator, also that he disregarded warnings given by some of the men. There were no written instructions concerning the train indicator.

In its conclusion, the report calls attention to the fact that, while train-indicator signals had been installed to safeguard the movement of motor cars on curves, nothing but oral instructions had been issued relative to their use, location and purpose; and apparently the employees were not particularly impressed with their importance. The attitude of two of the assistant foremen toward the roadmaster's instructions, the dissension among them, the failure to make provision for the men to obtain their belongings, the failure of the section foreman to remain with his men, and the ignoring of the train-indicator signal "indicate the existence of confusion and a lack of discipline which does not do credit to responsible supervising officials. Such a condition might reasonably be expected to result eventually in an accident of this character and points to the necessity of adopting more adequate protective measures to safeguard the movement of employees on motor cars."

It is recommended that "when employees are to be transported on motor cars, under circumstances such as obtained in this case, consideration be given to the desirability of making such movements upon train order authority so that they may be properly and adequately safeguarded."

Development of Cab Signals on the Pennsylvania

A. H. Rudd, chief signal engineer of the Pennsylvania, has prepared an elaborate account, illustrated with half a dozen pictures, of the development of the automatic cab signal on that road—the Pennsylvania having taken the lead in perfecting the cab signal sufficiently to induce the Interstate Commerce Commission to allow its use instead of automatic stops—and the article is printed in the MUTUAL [EMPLOYEES'] MAGAZINE, Philadelphia, for June.

The Pennsylvania introduced automatic train stops on the tubes in New York City, in 1910, and later it made experiments with the Gray-Thurber, the Finnigan and one or two other devices. When the railroads were being operated by the government (1918), the Pennsylvania proposed other tests, but the railroad administration would not make an appropriation. Beginning with order No. 13,413, issued by the Interstate Commerce Commission, in 1922, calling for automatic train control, the Pennsylvania promptly moved to comply with the government's requirements, and in February of that year, prepared for the two-year trial, which was made on the single-track line between Sunbury, Pa., and Lewistown. This experiment was with a speed-control system, but when, on July 18, 1924, the Commission allowed the use of the forestaller, the speed control system was put aside. In the Sunbury-Lewistown experiment, it will be recalled, the system was used mostly without wayside signals. Following these developments, new ideas were introduced rapidly and experimental installations were made between Baltimore and Harrisburg; between Camden and Atlantic City; between Columbus (Ohio) and Indianapolis, and on the New York division.

The coder system was first put in use on the Philadelphia division, in July, 1926, and cab signals, without automatic stops, were placed in service on a part of the New York division, in December, 1929. In February, 1931, the I.C.C. granted extensive permission for the operation of cab signals on several divisions, and, by February 15, 1933, all active locomotives were using the coder continuous system of cab signals, giving four indications. This part of the article contains a narrative of a great variety of ingenious inventions and modifications which had to be made, in order to adapt the coder system to the complicated conditions of the New York Terminal and other situations. The article closes with a brief account of the principal details of the coder system.

In connection with the Sunbury-Lewistown installation, Mr. Rudd says that the road spent on it $335,000, but the experience gained was "tremendously valuable"; and he classes the cab-signal, in its present state, where it is a vital element in the safety of train operation, unique in its completeness, as a by-product of the work done in the development of the automatic stop. In all these experiments, the Union Switch & Signal Company, with its large corps of engineers, was a constant collaborator.

In the beginning of his article, Mr. Rudd briefly sketches the history of signaling on the Pennsylvania, from 1870, when two interlocking machines were imported from England. The appointment of H. F. Cox, on December 1, 1870, was the first recognition of signaling as a department. George D. Fowle, Mr. Rudd's immediate predecessor, succeeded Mr. Cox on August 1, 1887, and he continued as engineer of signals for 20 years. Mr. Rudd had been employed there in 1888, and he succeeded Mr. Fowle on August 1, 1907. Mr. Grafton, who began service with the road in 1870, was signal engineer of the lines west of Pittsburgh, from 1889 to 1913. The first automatic train stop was the well-known trip, placed on the top of the locomotive cab, patented by A. S. Vogt (1880).

Mr. Rudd's article also appears in the Signalman's Journal, for July.

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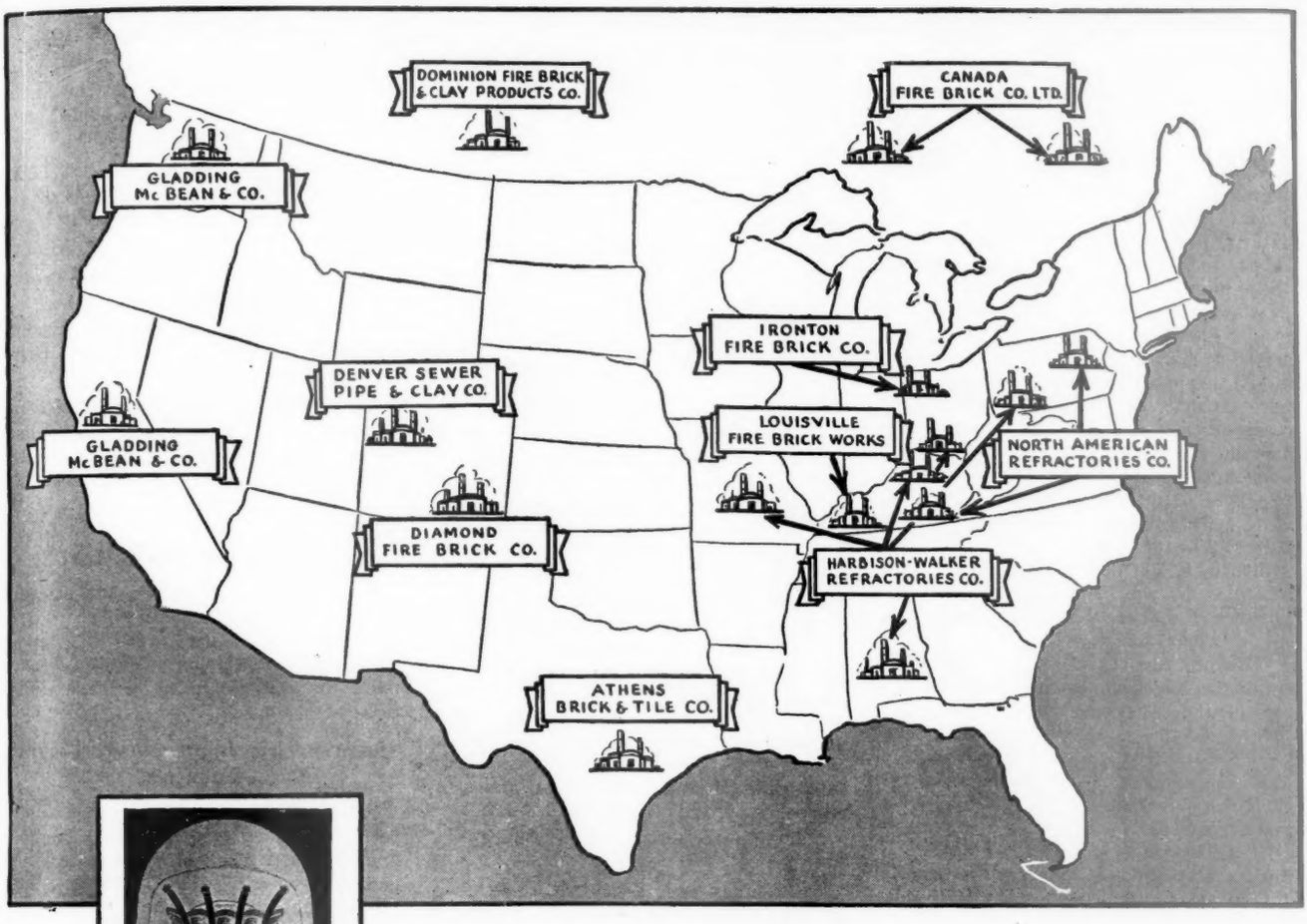
DOMINION FIRE BRICK & CLAY PRODUCTS CO.
CANADA FIRE BRICK CO. LTD.
GLADDING Mc BEAN & CO.
IRONTON FIRE BRICK CO.
DENVER SEWER PIPE & CLAY CO.
LOUISVILLE FIRE BRICK WORKS
NORTH AMERICAN REFRACTORIES CO.
GLADDING McBEAN & CO.
DIAMOND FIRE BRICK CO.
HARBISON-WALKER REFRACTORIES CO.
ATHENS BRICK & TILE CO.

A Service of Supply
That Means Economy
To the Railroads

Located at many points throughout the country, are Security Arch Brick Plants, convenient to every railroad center.

This service of supply is maintained by the American Arch Company to facilitate proper maintenance of Security Arches which assures maximum fuel economy.

AMERICAN ARCH COMPANY
INCORPORATED
Locomotive Combustion Specialists
NEW YORK CHICAGO

Taylor Asks a Square Deal for Railroads

Unshackled, the railroads are demonstrating their willingness and ability to work out their own destiny, said Harry G. Taylor, chairman of the Western Association of Railway Executives, in an address in New York on July 10. Mr. Taylor pleaded for a square deal in behalf of the carriers. "Leadership in the industry is not lacking," he asserted. "Streamlined trains, air-conditioning, speedier locomotives, new methods in freight handling are not the products of a defeated management. On the contrary, they are typical of the constructive initiative that flung the railroads across a great continent and created a transportation system unequalled in all the world. Such a spirit asks no favors. It asks only for a free field in which the governmental umpire applies, without discrimination, the same rules to all competitors."

Chairman Taylor's address, which was broadcasted, was entitled: "Riding the Western Rails to Real Recovery." He spoke in part as follows:

"The progressive railroads of the West salute the travel-minded East with the urgent invitation to come out all the way this year to make 1935 a 'See-America' jubilee. We are saying it with air-conditioned trains because the principal lines of the West are equipped now to give you that super-comfort.

"The big news in travel, of course, is this air-conditioning era, so vigorously dramatized by these same Western railroads. They set out in the fall of 1934 to make a real contribution to the economic recovery and by the time the new low rates went into effect, May 15, the job was done. The sum of $19,000,000 was spent to make these transcontinental flyers more inviting and more restful. Thousands were kept in gainful employment during the winter and spring months. In the face of receding revenues, private railroad management, acting in unison, hurled a challenge right into the teeth of 'Old Man Depression.' This act of courage has been rewarded, too, because passenger revenues have shown a substantial increase on our Western lines and the outlook for the current and succeeding months is full of promise.

"The railroads of the East have not been backward either. Pioneers in air-conditioning, they now supply a connecting service to our principal gateways that assures you dust-proof, noise-free, weather-controlled transportation all the way from coast to coast.

"That is the answer to the charge so often made by unthinking folks that the railroads are not progressive. Facts are a perfect defense for truth. Do you realize that the humble locomotive has had more improvements in the past decade than the internal combustion engine? Speeding up of steam trains, doubling and even tripling the daily runs are neither accidental nor a discovery. They are the direct results of mechanical ingenuity from within the technical divisions of the railroads themselves. Streamlining of vehicles has been given a tremendous impetus by these very railroads. Records believed unattainable have been made only to be broken a week or two later in this onward march of progress. *And there has been no compromise with safety*—in fact, the beginning and end of every experiment must match an inflexible rule that has for its first consideration the lives of passengers and the property of shippers.

"Air-conditioned trains, streamline flyers, speeded-up schedules—and not a dollar additional charge for these extra benefits to the traveling public. In fact, the basic fares and sleeping charges in the west are at 1915 low levels. Our Western railroads, like the progressive storekeeper, are offering better merchandise at lower cost with the hope that in volume will come a bigger net return.

"I have just come from one of the greatest emotional demonstrations that an industry has ever known in America—Railroad Week. This was the culmination of our informative advertising campaign to tell the country about these outstanding improvements adopted by the carriers of the West. Official recognition of Railroad Week came from the governors of 26 states and from more than 300 mayors.

"You will find the railroads leaders in the drive back to better times. And let me ask you to remember that all this progress has been made under private management. May I suggest that you do what you can to lighten the burden of these railroads, made difficult at times by repressive legislation."

Equipment and Supplies

LOCOMOTIVES

THE LUNG HAI RAILWAY, part of the Chinese National Railways, is inquiring for 10 locomotives of the 4-6-2 type. Chung-Tse Chien is managing director. The headquarters of the Chinese National are at Nanking, China.

PASSENGER CARS

THE BOARD OF TRANSPORTATION, CITY OF NEW YORK.—The contracts awarded to the American Car & Foundry Co., the Pullman-Standard Car Manufacturing Company and the Pressed Steel Car Company, for the construction of 500 steel passenger cars and extra trucks, reported in the *Railway Age* of July 13, page 56, have now been approved by the Board of Estimate & Apportionment.

IRON AND STEEL

THE SEABOARD AIR LINE is inquiring for 12,000 tons of rails.

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 4,000 tons of rails.

THE WHEELING & LAKE ERIE has ordered 1,100 tons of rails from the Carnegie Steel Company.

THE ILLINOIS CENTRAL has ordered 7,600 tons of rails, placing 4,560 tons with the Illinois Steel Company and 3,040 tons with the Inland Steel Company.

THE NEW YORK, CHICAGO & ST. LOUIS has ordered 130 tons of structural steel for bridges at Albany, Ind., and Muncie, from the Fort Pitt Bridge Works.

THE CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC has ordered 11,000 tons of rails from the Illinois and Inland Steel companies.

THE CHICAGO, BURLINGTON & QUINCY has ordered 165 tons of structural steel for a commercial coal pocket at East St. Louis, Ill., from the Stupp Brothers Bridge & Iron Company.

THE WABASH has ordered 5,000 tons of rails, placing 2,500 tons with the Illinois Steel Company, 1,250 tons with the Inland Steel Company and 1,250 with the Bethlehem Steel Company.

MISCELLANEOUS

THE CANADIAN NATIONAL has placed an order with the Timken Roller Bearing Company for bearings for the engine trucks of four class 4-8-2 steam locomotives, the installation to be made in the railroad shops.

Union Pacific Improvement Program Extensive

An extensive improvement program has been undertaken by the Union Pacific to improve its service and at the present time is well under way. The M-10000, a three-car unit, and the seven-car, Pullman-equipped M-10001, now called the Streamliner—City of Portland, have been placed in regular service between Kansas City, Mo., and Salina, Kan., and Chicago and Portland, Ore., respectively, while two more Pullman-equipped streamliners, each of 11 cars, are under construction and later this year will go into service between Chicago and Los Angeles, Cal., and Chicago and San Francisco, Cal.

The air-conditioning program has included not only the necessary Pullman standard and tourist sleeping cars, but also the air-conditioning of 131 Union Pacific-owned cars, including coaches, dining cars, observation cars and club cars. Forty of these were conditioned in the railroad's shops at Omaha, Neb., and 91 by the Pullman Company in Chicago.

The 1935 program also includes the conversion of 25 Mallet compound locomotives into single-expansion engines, the rebuilding and installation of loading devices in 500 automobile cars, 250 of which have already been completed; and the rebuilding of 1,970 box cars. Since the first of the year 27,000 tons of steel rail and 20,000 tons of fittings, 2,000,000 crossties and approximately 8,000,000 ft. of lumber of various sorts for box cars, bridge and building work and for replacing stock have been purchased.

In Southern Utah a 14-mile branch line to serve the Columbia Steel Corporation in opening a new iron ore deposit is being constructed.

A total of 35 streamlined motor buses costing $500,000 have been purchased for the Interstate Transit Lines and the Union Pacific Stages.

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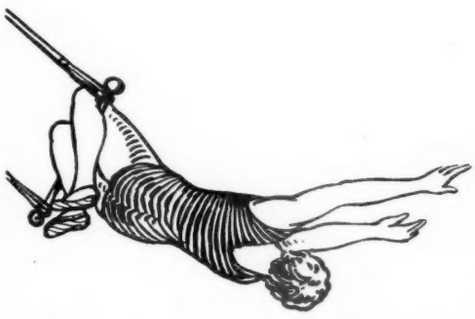
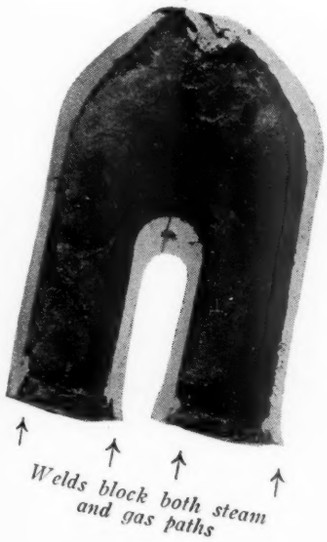
If She Makes It



everything will be fine . . .

Failure of wall of substitute superheater return bend



Welds block both steam and gas paths

ON THE flying trapeze everything depends on "IF" . . . today it might be a success—tomorrow a failure. Nothing is certain.

But train schedules cannot depend on day-to-day uncertainties . . . trains must be on time—the locomotives must be in condition.

For example, when locomotives go to the backshop for firebox renewal, the superheater units, too, should be renewed. It is unnecessary to purchase new superheater units, however, as the worn units generally can be REmanufactured . . . restored to a condition practically equivalent in every way to new units.

REmanufactured units, like new units, are one piece from end to end, because the return bends and ball ends are die-forged from the tubing itself. There are no joints with internal and external ridges to cause obstructions in the steam and gas paths . . . no joints likely to fail.

The Elesco type A superheater averages about 200 return bends and ball ends; the Elesco type E has about 400. An attempt to patch repair or to butt-weld parts together to form units, is merely to add that many possibilities for obstruction to the gas and steam flow or even for engine failures.

When your locomotives go to the backshop, you are assured many more years of full superheater effectiveness and performance dependability by having unserviceable units REmanufactured.

THE SUPERHEATER COMPANY

Representative of AMERICAN THROTTLE COMPANY, Inc.

60 East 42nd Street
NEW YORK

ELESCO

Peoples Gas Building
CHICAGO

A-986

Canada: The Superheater Company, Limited, Montreal

Superheaters - Feed Water Heaters - Exhaust Steam Injectors - Superheated Steam Pyrometers - American Throttles

Supply Trade

T. W. Becker has been appointed manager of the New York office of **Lyon Metal Products, Inc.,** Aurora, Ill. **W. E. Long,** former manager of the New York office, has been promoted to manager of the Steel Equipment Division, with headquarters at Aurora.

The Air Conditioning Department of the **Westinghouse Electric & Manufacturing Co.** has been transferred from East Pittsburgh, Pa., to Mansfield, Ohio, where it becomes a part of the Merchandising Division, according to a July 17 announcement by A. E. Allen, vice-president in charge of Westinghouse merchandising operations. This transfer affects all sales, engineering and manufacturing activities of the Air Conditioning Department; its purpose is to effect a closer coordination, particularly in the design and manufacture of air conditioning equipment with the other closely allied products now within the scope of the Merchandising Division. Announcing the transfer, Mr. Allen stated that the company's air conditioning program will be enlarged and expanded, and that Westinghouse will continue to distribute its air conditioning products through its present dealer channels. **S. F. Myers** will continue as manager of air conditioning sales.

Charles F. Goodrich has been appointed chief engineer of the **American Bridge Company,** succeeding **Richard Khuen, Jr.,** who has retired after more than 41 years of service with the company. Mr. Goodrich has been associated with the American Bridge Company for

Charles F. Goodrich

the past 29 years. He is a native of Manchester, N. H., and a graduate of Dartmouth College and Thayer School of Civil Engineering. Mr. Goodrich started as a draftsman at the Trenton plant of the American Bridge Company, and advanced through the estimating and engineering departments to assistant chief engineer, which position he has held since 1933.

John E. Long, mechanical engineer of the **Franklin Railway Supply Company, Inc.,** with headquarters at Chicago, has been appointed assistant to the vice-president at the Chicago office. Mr. Long was born in 1899 and was graduated from Purdue University in 1923. Prior to his graduation he was employed in various capacities by the Pennsylvania, the Baltimore & Ohio, and the Atchison, Topeka & Santa Fe. In 1923 he went with the Lima Locomotive Works, Incorporated, remaining with that company for 11 years. While with Lima, Mr. Long was in the calculating, service, engineering and sales departments and had an extensive experience in special design work and in locomotive testing. He also engaged in the study of operating conditions on various roads with a view to applying the most efficient designs of locomotives to the specific operations. Since June, 1934, Mr. Long has served as mechanical engineer of the Franklin Railway Supply Company, Inc., at Chicago.

John E. Long

OBITUARY

James M. Collins, general manager and assistant treasurer of the Maloney Oil & Manufacturing Co., Scranton, Pa., for more than 20 years, until his illness two years ago, died on July 11 at his home in Scranton.

Harry H. Linton, representative at New York of the W. N. Thornburgh Manufacturing Company, Cicero, Ill., and for many years in the railway supply business, died at his home in New York on June 12.

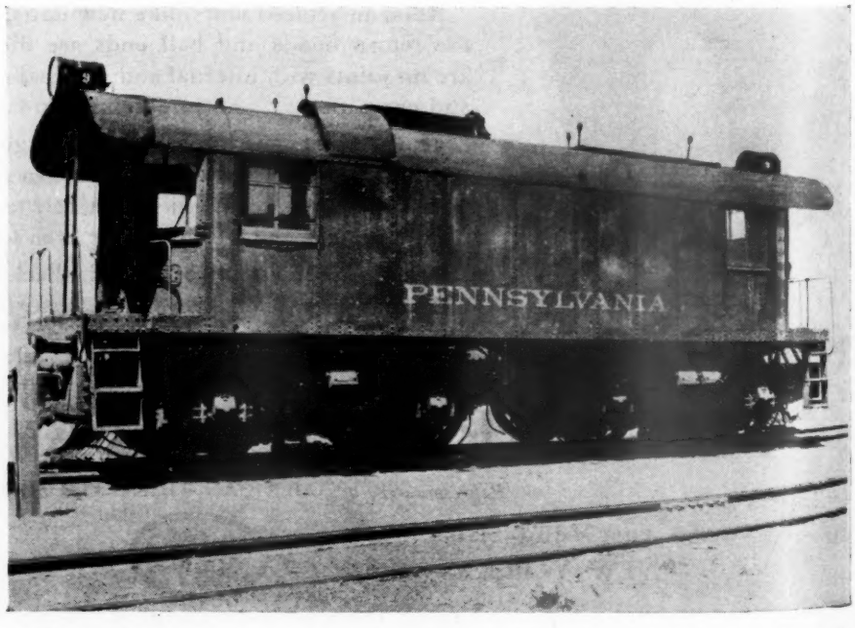
TRADE PUBLICATIONS

INLAND 4-WAY FLOOR PLATE.—A 60-page letter-size folder describing and illustrating its new light pattern 4-Way floor plate has been issued by the Inland Steel Company, Chicago. The folder also discusses in a general way the two other patterns of 4-Way floor plate that are manufactured by this company.

PLANNING GRADE SEPARATIONS.—The Armco Culvert Manufacturers Association, Middletown, Ohio, has issued a 60-page folder entitled, "Planning Grade Separations for Stability and Economy," which points out various ways in which Armco products can be used advantageously in the construction of grade separation structures.

TIMKEN ENGINEERING JOURNAL.—The third edition of the Timken Engineering Journal has been issued by the Timken Roller Bearing Company, Canton, Ohio. This issue contains 260 pages and, like the previous editions, it is compiled in loose-leaf form in a heavy three-ring binder with stiff covers. In addition to the customary detailed index, this issue has a marginal tab index for ready reference. This book contains descriptions of the various types of Timken bearings, as well as technical data on ratings, load calculations, bearing selections and other information pertinent to the mounting, use and maintenance of Timken bearings.

* * * *



An Early Type of Pennsylvania Electric Locomotive—This Westinghouse-Equipped Engine, the Only One of Its Type to Be Constructed, Was Built in 1906 at the P.R.R. Juniata (Pa.) Shops

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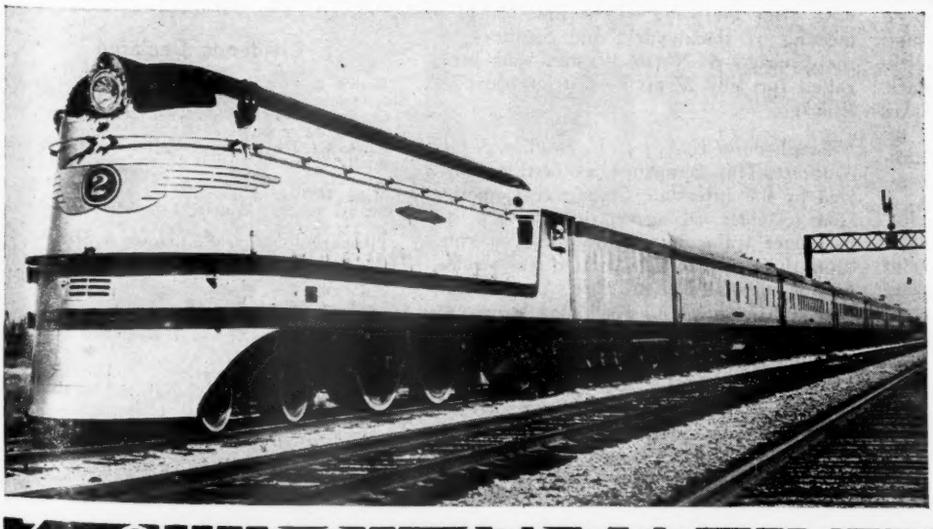
ALCO

REVENUE

In the last analysis the amount of revenue return is the best measure of the worth of an investment made to improve a particular service. . . The "Hiawatha" carried 9,258 revenue passengers in the first 19 days of its operation — May 29th to June 16th. On Saturday, June 15th, the first day that the seventh car was added to this train, 405 revenue passengers were carried on the northbound run and 326 on the southbound run, a total of 731 passengers in one day. . . The extra car is still being retained and an added stop is being made at Red Wing. And the locomotive goes right on making the same schedule with ease.

AMERICAN LOCOMOTIVE COMPANY



50 CHURCH STREET · NEW YORK · N.Y.

Construction

CHICAGO, BURLINGTON & QUINCY.—In connection with the rehabilitation of its lines in Nebraska that were affected by the recent floods, this company has awarded a contract to the Central Bridge & Construction Company, Wahoo, Neb., for the grading of 6.5 miles of relocated line between Holbrook, Neb., and Cambridge. About 300,000 cu. yd. of grading are involved.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—A contract for the construction of a 15-stall enginehouse at Itasca, Wis., has been awarded by this company to the James Leck Company, Minneapolis, Minn.

GRAND TRUNK WESTERN.—A general contract has been awarded to the Austin Company, Detroit, Mich., for the erection of a structural steel building at Port Huron, Mich., to replace that portion of this company's freight car repair shop at that point which was destroyed by fire on January 9, 1935. The new portion of the building will have a length of 500 ft., a width of 82 ft., and a side section 160 ft. long and 28 ft. wide. It is to be constructed of structural steel removed from the company's car shop building at Elsdon, Ill. The exterior walls will consist of insulated metal siding with new steel sash, while the roofing will consist of asphalt on a wood deck. In addition to the usual mechanical and electrical equipment and heating facilities, the structure will be equipped with a 7½-ton traveling bridge crane. The new structure is to be used for the repair of steel freight cars, while the undamaged portion of the shop is to be used for making repairs to wooden equipment. The reconstruction of this shop will cost about $100,000.

SOUTHERN PACIFIC.—The Arizona State Highway Commission has awarded a contract to M. M. Sundt, Tucson, Ariz., for the construction of a subway to carry U. S. Highway 80 (Stone avenue) under the tracks of this company at Tucson, at a cost of $112,900.

STATEN ISLAND RAPID TRANSIT RAILWAY COMPANY, (B. & O. Subsidiary).—Bids are wanted at the office of the chief engineer, B. & O. Central building, Baltimore, Md., until 11 a.m. Eastern Standard Time, July 30, for grading, construction of bridges, etc., account of elimination of grade crossings, Elm Park—Mariners Harbor, Staten Island, N. Y. Plans, etc., may be examined at office of assistant engineer, Stapleton, Staten Island.

UNION PACIFIC.—This company plans to start work immediately on the renewal of the pile trestle bridge which carries its line across the Platte river near Denman, Neb. The new structure will be a 109-span pile trestle, 1,526 ft. long, having six creosoted piles per bent and eight stringers, per 14-ft. panel. All work in connection with this project is to be done by company forces.

WHEELING & LAKE ERIE.—A contract for the relocation of 9.33 miles of this road in the vicinity of the Beach City (Ohio) reservoir, has been awarded to the Gilbert Construction Company, Beckley, W. Va., by the United States Engineer Office at Zanesville, Ohio.

Financial

CHESAPEAKE & OHIO.—*Van Sweringen Asks Authorization To Serve As Chairman.*—With a view to becoming chairman of the board, O. P. Van Sweringen, chairman of the board of the Missouri Pacific, has applied to the Interstate Commerce Commission for authority to serve as director and officer of the Chesapeake & Ohio and Pere Marquette and affiliated companies in adding to holding office with other companies. The application points out that at the time he became connected with the Missouri Pacific and its system companies he resigned from the eastern companies because of the policy of the commission against interlocking relations between the systems proposed in its consolidation plan but states that the declared policy of the commission is not now applicable because the Missouri Pacific and other companies in the western system are not now operating companies, since their properties are being operated by trustees. It is suggested that the commission's order might include a provision that if and when the Missouri Pacific, International-Great Northern, and New Orleans, Texas & Mexico should become operating companies again Mr. Van Sweringen should resign from either the eastern or the western group.

CHICAGO & EASTERN ILLINOIS.—*Hearing on Reorganization Plan Postponed.*—The Interstate Commerce Commission has again postponed, from July 15 to September 17, the hearing on the proposed plan for reorganizing this company under the bankruptcy law.

CHICAGO & NORTH WESTERN.—*Creditors' Meeting.*—In compliance with Section 77 of the amended Bankruptcy Act to the effect that a hearing be held within 30 days after the filing of the first order, a meeting of stockholders and creditors of the Chicago & North Western has been called for July 27 at the district court in Chicago.

ERIE.—*Joint Use of L. V. Buffalo, N. Y. Station.*—This company has been authorized by the Interstate Commerce Commission to enter an agreement whereby its passenger trains into Buffalo will operate from the Lehigh Valley station and service will be suspended at the Erie's present station at Michigan and Exchange streets in that city. The arrangement contemplates that the Erie will pay an annual rental of $39,000 and will have trackage rights over the Lehigh Valley from a point east of Scott street into the terminal, 1.43 miles.

GREAT NORTHERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon a line from Republic, Wash., to Knob Hill Spur, 5 miles.

MANISTEE & REPTON.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its line from a point near Monroeville, Ala., to Frisco City, 9 miles.

MINNEAPOLIS & ST. LOUIS.—*Abandonment.*—A proposal to abandon five branch lines of the Minneapolis & St. Louis in Iowa, totaling 125.7 miles, was submitted to the federal court at Minneapolis, Minn., on July 13, by receivers of the road.

NEW YORK, CHICAGO & ST. LOUIS.—*R. F. C. Loan Extension.*—The Interstate Commerce Commission, finding this road is not in need of financial re-organization, has authorized the extension to February 27, 1937, of loans from the Reconstruction Finance Corporation aggregating $8,811,587, which mature on July 27, August 31, September 28 and October 1.

NORTHWESTERN PACIFIC.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon part of its Guerneville branch, from Fulton, Calif., to Duncan Mills, 22.987 miles.

PEARL RIVER VALLEY.—*Abandonment.*—The Interstate Commerce Commission, Division 4, has authorized this company to abandon part of its line from Goodyear, Miss., to Etal, 20.07 miles.

PERE MARQUETTE.—*R. F. C. Loan Extension.*—The Interstate Commerce Commission, finding this road not to be in need of financial re-organization, has authorized the extension for three years of a $3,000,000 loan from the Reconstruction Finance Corporation which matured on July 19.

SOUTHERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its line from Roseland, Ga., to Williamson, 40.1 miles.

Average Prices of Stocks and of Bonds

	July 16	Last week	Last year
Average price of 20 representative railway stocks..	34.78	34.14*	40.72
Average price of 20 representative railway bonds..	74.71	75.11	77.70

* Corrected.

Dividends Declared

Boston & Providence.—$2.12½, quarterly, payable October 1 to holders of record September 20.

Cincinnati Northern.—$6.00, semi-annually, payable July 31 to holders of record July 20.

Louisville, Henderson & St. Louis.—$4.00, semi-annually, payable August 15 to holders of record August 1.

Mine Hill & Schuylkill Haven.—$1.25, semi-annually, payable August 1 to holders of record July 15.

Pittsburgh, Cincinnati, Chicago & St. Louis.—$2.50, payable July 20 to holders of record July 10.

Pullman.—75c, quarterly, payable August 15 to holders of record July 24.

Shamokin Valley & Pottsville.—$1.50, semi-annually, payable August 1 to holders of record July 15.

JUNE SHIPMENTS of railroad locomotives as reported to the U. S. Department of Commerce by the country's principal manufacturing plants, totaled 27, as compared with 18 in May and 3 in June, 1934. Unfilled orders at the end of June totaled 43, as compared with 68 at the end of May and 137 at the end of June, 1934.

Continued on next left-hand page

Below Zero in Temperature
but HIGH IN OPERATING EFFICIENCY

TRAIN OPERATION
CENTRALIZED TRAFFIC
CONTROL TERRITORY.
RED OAK TO BALFOUR, IOWA

	Date	Train	Eng.	Cars	Tons	From	Meeting Point	
Red Oak 5.7 Mi. – McPherson 3.5 Mi. – Emerson 5.3 Mi. – Hastings 4.7 Mi. – Malvern 5.2 Mi. – Balfour								
1.	1-19 1935	30 Ex.	3001 5355	9 70	Pass. 2752	Emerson Red Oak	7:43 PM McPherson 7:48 PM 7:14 PM McPherson 7:39 PM – 7:48 PM	
2.	1-20	9 12	3002 2950	10 8	Pass. Pass.	Emerson Malvern	9:43 PM Hastings 9:46 PM Hastings	9:51 PM – Non-stop 9:51 PM
3.	1-21	9 12	3000 2950	10 7	Pass. Pass.	Hastings Balfour	9:33 PM Malvern 9:32 PM Malvern	9:39 PM – Non-stop 9:39 PM
4.	1-21	61 70	5320 5353	56 42	2065 1450	Hastings Balfour	8:39 PM Malvern 8:52 PM Malvern	8:48 PM – 8:58 PM 8:58 PM
5.	1-21	9 70	3000 5353	10 42	Pass. 1450	Red Oak Emerson	9:16 PM McPherson 9:25 PM 9:12 PM McPherson 9:18 PM – 9:25 PM	

1. By having power controlled switches were able to move extra 5355 to McPherson for No. 30, whereas under manual operation train would have been held at Red Oak receiving additional delay of 40 minutes. Temperature Zero.
2-3. Passenger trains 9 and 12, non-stop meet. Saved 8 minutes delay No. 9 by having power controlled switches.
4. By having power controlled switches saved ten minutes to No. 61 after No. 70 passed in not having to close switches, also fuel saving in No. 61 not having to stop and open switches to head in.
5. Power controlled switches saved 10 minutes to No. 70 in not having to stop to handle switches, also fuel saving in not having to stop and open switches to head in.
Temperature at time of movement, Jan. 20th, 10 below Zero; Jan. 21st, 6 below.
Creston, Iowa, January 24, 1934.

C.T.C.

974

OPERATING efficiencies made possible with "Union" Centralized Traffic Control are excellently indicated in the above statement of train operation between Red Oak and Balfour on the Burlington. » » » » »

Train operation by signal indication, without written train orders, has been a self-liquidating investment wherever "Union" Centralized Traffic Control has been installed. » » » » »

"Union" engineers will be glad to estimate the savings to be effected by an installation on any division of your road. Consult our nearest district office.

1881 **Union Switch & Signal Co.** 1935
SWISSVALE, PA.
NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO

Railway Officers

EXECUTIVE

Executive Changes on the National of Mexico

The following changes have been announced among executive officers of the National Railways of Mexico:

Leopoldo Vazquez has been appointed assistant executive president.

General Francisco J. Mujica, secretary of communications and public works of the Mexican government, has been appointed vice-president of the National Railways.

Conrado C. Rochin has been appointed vice-president and general manager, succeeding **Nicolas Procel,** who has been appointed superintendent of car service. **J. A. Jaime,** superintendent of car service, has been appointed assistant superintendent of car service.

David S. Alonso, superintendent terminals at San Luis Potosi, S. L. P., has been appointed general superintendent of transportation, succeeding **J. J. Franco.**

Sixto Martinez, superintendent of shops at Aquascalientes, Aquas., has been appointed superintendent of motive power, vice **P. C. Morales.**

Felipe J. Sanchez has been appointed chief engineer to succeed **Salvador M. Arcocha.**

Manuel V. Orozco has been appointed general superintendent of express, vice **J. Guadalupe Estrada.**

Esteban B. Calderon has been appointed general purchasing agent, succeeding **J. Ignacio Gomez.**

Jose J. Zuno has been appointed general attorney in charge of the law department to replace **Eleazar del Valle.**

All these officers will have offices at Mexico, D. F.

Clarence R. Dugan, special agent in the land and tax department of the New York Central, with headquarters at New York, has been appointed assistant to the vice-president, law, with the same headquarters, with duties to be assigned, principally in matters of public relations.

Francis E. McKenzie, assistant general freight agent of the Atlantic Coast Line, with headquarters at Wilmington, N. C., has been appointed assistant to vice-president, with the same headquarters. Mr. McKenzie was born in Greenville, S. C., on November 23, 1893. He was educated at Porter Military Academy and entered the service of the Atlantic Coast Line in October, 1908, as junior clerk at Savannah, Ga. He served in various capacities at that point until the early part of 1918, when he joined the United States Army. Upon his discharge from the Army, Mr. McKenzie returned to the Atlantic Coast Line at Savannah as head of the inbound bureau. In November, 1919, he was transferred to the assistant general freight agent's office as chief quotation clerk. He became chief clerk to the assistant general freight agent in July, 1920, and in March, 1924, he became commercial agent at Savannah. From July, 1924, to February, 1925, Mr. McKenzie served successively as chief clerk in the

Francis E. McKenzie

freight traffic department at Wilmington, N. C., and as commerce agent at the same point. He was appointed assistant to general freight agent at Wilmington in March, 1926, and in February, 1930, he was advanced to the position of assistant general freight agent at Wilmington, serving in that capacity until his recent promotion.

FINANCIAL, LEGAL AND ACCOUNTING

J. B. Green, claim agent on the Kansas City Southern, has been appointed to the newly-created position of general claim agent, with headquarters as before at Kansas City, Mo. **W. C. Rochelle,** claim agent at Texarkana, Tex., has been appointed to the newly-created position of assistant general claim agent, with headquarters at Shreveport, La.

J. F. Morris, assistant general auditor of the Denver & Rio Grande Western, who has been promoted to general auditor, with headquarters as before at Denver, Colo., as reported in the *Railway Age* of July 13, was born on July 28, 1869, at Dublin, Ireland. Mr. Morris attended the Irish national schools and received his higher education at the Glasnevin model school in Dublin. He entered the service of the Denver & Rio Grande Western in 1887 as a clerk, being advanced in 1895 to disbursement clerk. In 1903 Mr. Morris was promoted to chief clerk to the general auditor and in 1907 he was advanced to auditor of disbursements. He went with the Missouri Pacific in 1916, as assistant to the vice president in charge of accounts, with headquarters at St. Louis, Mo., returning to the D. & R. G. W. in 1917 as assistant general auditor, which position he held until his recent appointment.

OPERATING

E. E. Foulks, a transportation inspector on the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., has been appointed trainmaster on the Albuquerque division, with headquarters at Winslow, Ariz., to succeed **F. B. Grim,** who has been transferred to the Los Angeles division, with headquarters at Los Angeles. **A. B. Coakley,** secretary to the general manager at Los Angeles, has been appointed transportation inspector, with the same headquarters, to succeed Mr. Foulks.

TRAFFIC

O. H. Reid, general agent for the St. Louis-San Francisco at Tulsa, Okla., has been transferred to Denver, Colo., succeeding **W. L. Evans,** who has retired.

Fred L. Taylor, live stock agent on the Chicago, Burlington & Quincy, Lines West of the Missouri river, with headquarters at Omaha, Neb., has been appointed to the newly-created position of general live stock agent, with the same headquarters. **O. O. Waggener,** agricultural agent at Chicago, has been appointed to the newly-created position of assistant general live stock agent, Lines East of the Missouri river, with the same headquarters, and **Oscar C. Swan,** live stock agent at Denver, Colo., has been appointed assistant general live stock agent, Lines West of the Missouri river, with the same headquarters.

ENGINEERING AND SIGNALING

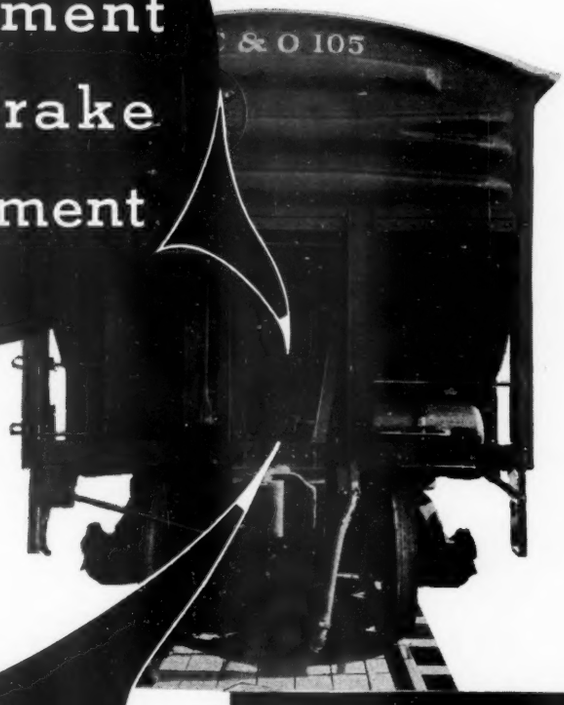
W. O. Dennis, whose appointment as engineer maintenance of way for the Lehigh & New England, with headquarters at Bethlehem, Pa., was noted in the *Railway Age* of July 6, was born on December 31, 1882, at Nazareth, Pa., and educated at Nazareth Hall Military Academy and Lafayette College, Easton, Pa. After being employed in the engineering department of the Lehigh & New England during his summer vacations while in college,

W. O. Dennis

Mr. Dennis entered the active railroad service as transitman on the Lehigh & New England during the summer of 1905, since which date he has continued in the service of this road. He was advanced to various positions in the engineering department to that of assistant engineer, which position he held until March, 1913, when he was promoted to assistant supervisor, with headquarters at Pen Argyl, Pa.

Continued on next left-hand page

The Latest Achievement in Air Brake Development



New Chesapeake and Ohio light-weight, high-capacity hopper car equipped with the Westinghouse "AB" *automatic* Empty and Load Brake. » » »

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The greatest advance made in Air Brake equipment during the past year is the Westinghouse "AB" Empty and Load Brake for light-weight, high-capacity freight cars . . . . Its distinctive feature is the *automatic control* of braking power for either an empty or loaded car. » » »

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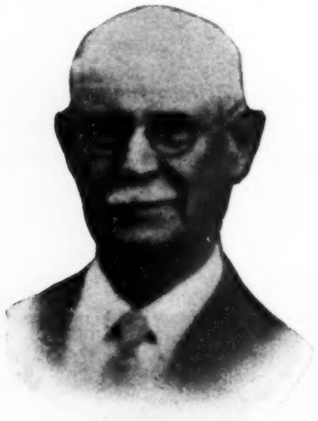
WESTINGHOUSE AIR BRAKE CO.

General Office and Works WILMERDING, PA.

In April, 1917, Mr. Dennis was advanced to the position of supervisor, with the same headquarters. In February, 1924, he was promoted to inspector maintenance of way, which position he held until his recent appointment as engineer maintenance of way.

F. W. Gilcreast, whose appointment as consulting engineer of the Lehigh & New England was noted in the *Railway Age* of July 6, was born on April 2, 1858, in Massachusetts. He completed his scholastic education at Tufts College. While in college Mr. Gilcreast worked as chainman on the Boston & Lowell (now Boston & Maine) during his summer vacations. He entered active railroad service as rodman on the New York & New England (now New York, New Haven & Hartford) in 1880. In 1881 he became levelman and resident engineer on location and construction on the Nickel Plate and in 1882 became resident engineer in charge of construction on the Buffalo, Rochester & Pitts-



F. W. Gilcreast

burgh (now Baltimore & Ohio). In 1884 Mr. Gilcreast was appointed division engineer on the latter road. From 1885 to 1889 he was employed as construction engineer for the contractors in the construction of the Croton Aqueduct, New York City water supply. In 1889 he re-entered railroad service as division engineer in charge of construction and maintenance of the Schuylkill & Lehigh Valley (now Lehigh Valley), continuing in that capacity until 1893. From 1893 to 1911 he was employed as division engineer in charge of construction and maintenance of the Hazleton division of the Lehigh Valley. In January, 1911, Mr. Gilcreast entered the service of the Lehigh & New England as chief engineer in charge of construction of the Tamaqua extension. Upon the completion of that construction project in December, 1913, he was appointed engineer maintenance of way, with headquarters at Bethlehem, which position he held until his recent appointment as consulting engineer.

MECHANICAL

Henry Yoerg, superintendent of motive power of the Great Northern, who has been appointed general superintendent of motive power, with headquarters as before at St. Paul, Minn., as announced in the *Railway Age* of June 29, entered the service of the Great Northern on May 1, 1897, as a draftsman, with headquarters at St. Paul. In 1902, Mr. Yoerg was appointed superintendent of shops at Havre, Mont., and about a year later he was transferred to St. Paul. In 1908, he was advanced to mechanical engineer and in 1917, Mr. Yoerg was further promoted to assistant superintendent of motive power. In 1920 he was advanced to superintendent of motive power, which position he held until his recent appointment.

William Kelly, general superintendent of motive power of the Great Northern at St. Paul, Minn., who has retired, as reported in the *Railway Age* of June 29, was connected with this road continuously for nearly 59 years. Mr. Kelly served as both fireman and engineman on the "William Crooks," the first locomotive of the Great Northern. He entered the service of the St. Paul, Minneapolis & Manitoba (now part of the Great Northern) as a machinist's helper in the St. Paul shops on November 25, 1876, and in 1878 he was advanced to locomotive fireman. After three years in the latter position Mr. Kelly was promoted to engineman and early in 1892 he became locomotive foreman at Willmar, Minn. Later in the same year, when the Great Northern was completed through to the Pacific coast, Mr. Kelly was sent to Spokane, Wash., as division master mechanic. In 1903, he became general master mechanic at Spokane and in 1916 he was advanced to assistant superintendent of motive power with the same headquarters, being transferred to St. Paul a year later. On February 25, 1920, he was promoted to general superintendent of motive power, which position he continued to hold until his retirement.

Roy F. Abell, assistant mechanical engineer of the International-Great Northern (a unit of the Missouri Pacific Lines) with headquarters at Palestine, Tex., who has been appointed mechanical engineer, with the same headquarters, as reported in the *Railway Age* of July 13, was born on December 18, 1896, at Parsons, Kan. He took three years of extension work at Washington university and also studied for a year at the Ranken school of mechanical trades in St. Louis, Mo. Mr. Abell entered railway service in 1912 as a machinist apprentice on the Atchison, Topeka & Santa Fe at Albuquerque, N. M., where he was advanced to machinist in June, 1916. In the following year he went with the Missouri-Kansas-Texas in the same capacity but gave up his position in April, 1918, to enter the United States army, serving overseas until September, 1919. Following the war Mr. Abell resumed his former position as machinist on the Katy at Parsons, Kan., where he remained until May, 1920, when he was transferred to St. Louis. In 1923 Mr. Abell became a draftsman with the International Shoe Company, where he remained until 1924, when he took a similar position with the Commonwealth Steel Company at Granite City, Ill. From September, 1925, to July 15, 1928, Mr. Abell served as a general draftsman for the Missouri Pacific Lines at St. Louis, then being promoted to assistant mechanical engineer of the International-Great Northern, with headquarters at Palestine, which position he held until his recent appointment.

PURCHASES AND STORES

Victor R. Naylor, who has been appointed general inspector of stores of the Southern Pacific with headquarters at San Francisco, Cal., succeeds **S. L. Bouque,** who has been appointed chief clerk to the general storekeeper. In the item announcing Mr. Naylor's appointment that appeared in the June 22 issue it was stated incorrectly that the position of general inspector of stores was newly created.

C. C. Warne, purchasing agent for the New York Central, with headquarters at New York, has had his jurisdiction extended to include also the Boston & Albany and **F. S. Austin,** purchasing agent for the Boston & Albany, with headquarters at Boston, Mass., has been appointed assistant purchasing agent of the New York Central, with headquarters at New York. **H. Hyslop** has been appointed assistant to the purchasing agent of the Boston & Albany, with headquarters at Boston.

OBITUARY

H. B. Walters, coal freight agent for the Central of New Jersey, with headquarters in New York, died at his home in Dunellen, N. J., on July 7.

Willis H. Ogborn, assistant general freight agent on the Baltimore & Ohio and Alton, with headquarters at Chicago, died on July 12 at his home at that point.

T. E. Layden, assistant engineer of tests of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., died on July 12 in the Santa Fe hospital at Topeka.

John O. Madison, engineer of cars and shops, Board of Transportation, City of New York, died suddenly on July 12. Mr. Madison was in charge of the design and construction of the cars now in operation in the Independent Subway, New York.

William A. Hamilton, who at one time served as a vice-president of the St. Louis Southwestern, died on July 16 at the Columbia Presbyterian Medical Center, New York, after a brief illness. Mr. Hamilton was 75 years old. During his railway career he also served with the Texas & Pacific and the Missouri Pacific in different capacities.

Patrick J. McAndrews, roadmaster on the Galena division of the Chicago & North Western, with headquarters at Sterling, Ill., who for many years was a prominent figure in the Roadmasters and Maintenance of Way Association, died on July 11 following a brief illness. Mr. McAndrews served as president of the Roadmasters Association in 1915, and as secretary from 1916 to 1924. At the time of his death he was a member of the executive committee. He was also a past president of the Maintenance of Way Club of Chicago.

Operating Revenues and Operating Expenses of Class I Steam Railways in the United States

Compiled from 145 Monthly Reports of Revenues and Expenses Representing 149 Class I Steam Railways

FOR THE MONTH OF MAY, 1935 AND 1934

Item	United States		Eastern District		Southern District		Western District	
	1935	1934	1935	1934	1935	1934	1935	1934
Average number of miles operated	237,952	238,981	59,018	59,072	45,245	45,420	133,689	134,489
Revenues:								
Freight	$224,330,272	$228,602,822	$98,291,992	$102,053,099	$43,718,582	$44,496,310	$82,319,698	$82,053,413
Passenger	27,114,111	26,575,372	15,893,498	16,074,601	3,319,607	3,181,451	7,901,006	7,319,320
Mail	7,661,575	7,562,261	2,955,282	2,950,251	1,383,257	1,331,989	3,323,036	3,280,021
Express	7,573,895	7,094,077	3,082,380	2,860,611	1,604,558	1,525,980	2,886,957	2,707,486
All other transportation	6,606,463	6,457,829	3,450,932	3,424,553	618,622	595,470	2,536,909	2,437,806
Incidental	5,643,942	5,152,260	2,931,035	2,825,939	836,357	769,448	1,876,550	1,556,873
Joint facility—Cr.	823,638	750,352	229,707	225,407	221,124	192,676	372,807	332,269
Joint facility—Dr.	204,575	155,661	50,313	45,833	17,289	17,343	136,973	92,485
Railway operating revenues	279,549,321	282,039,312	126,784,513	130,368,628	51,684,818	52,075,981	101,079,990	99,594,703
Expenses:								
Maintenance of way and structures	34,632,956	35,053,922	12,869,514	13,568,684	6,356,084	6,308,629	15,407,358	15,176,609
Maintenance of equipment*	57,004,725	56,797,361	25,035,306	25,916,556	10,879,764	10,627,002	21,089,655	20,253,803
Traffic	8,214,900	7,525,208	3,105,683	2,825,821	1,534,682	1,364,544	3,574,535	3,334,843
Transportation	103,162,633	96,587,481	47,222,677	45,675,639	17,554,348	16,366,880	38,385,608	34,544,962
Miscellaneous operations	2,416,009	2,057,564	1,111,948	1,018,684	279,197	235,183	1,024,864	803,697
General	4,145,668	12,251,564	4,241,769	5,387,345	1,877,936	2,077,237	*d* 1,974,037	4,786,982
Transportation for investment—Cr.	380,955	244,939	140,004	50,094	43,689	32,400	197,262	162,445
Railway operating expenses	209,195,936	210,028,161	93,446,983	94,342,635	38,438,322	36,947,075	77,310,721	78,738,451
Net revenue from railway operations	70,353,385	72,011,151	33,337,620	36,025,993	13,246,496	15,128,906	23,769,269	20,856,252
Railway tax accruals	20,897,991	21,665,002	8,911,818	9,104,765	4,319,574	4,345,115	7,666,599	8,215,122
Uncollectible railway revenues	89,196	117,274	38,274	73,089	17,755	10,431	33,167	33,754
Railway operating income	49,366,198	50,228,875	24,387,528	26,848,139	8,909,167	10,773,360	16,069,503	12,607,376
Equipment rents—Dr. balance	6,798,894	7,566,562	3,100,172	3,798,044	711,974	748,631	2,986,208	3,019,887
Joint facility rent—Dr. balance	3,062,236	2,963,120	1,708,644	1,640,294	369,038	363,704	984,554	959,122
Net railway operating income *a*	39,505,068	39,699,193	19,578,172	21,409,801	7,828,155	9,661,025	12,098,741	8,628,367
Ratio of expenses to revenues (per cent)	74.83	74.47	73.71	72.37	74.37	70.95	76.48	79.06
* Includes:								
Depreciation	15,997,814	15,555,159	7,015,712	6,882,142	3,101,891	2,945,358	5,880,211	5,727,659
Retirements	163,173	295,599	59,694	98,603	38,440	141,098	65,039	55,898
Maintenance of equipment before depreciation and retirements	40,843,738	40,946,603	17,959,900	18,935,811	7,739,433	7,540,546	15,144,405	14,470,246
Net railway operating income before depreciation and retirements	55,666,055	55,549,951	26,653,578	28,390,546	10,968,486	12,747,481	18,043,991	14,411,924

FOR FIVE MONTHS ENDED WITH MAY, 1935 AND 1934

Average number of miles operated	238,049	239,256	59,021	59,115	45,258	45,458	133,770	134,683
Revenues:								
Freight	$1,091,936,753	$1,094,362,372	$486,280,147	$489,509,073	$220,590,083	$225,210,200	$385,066,523	$379,643,099
Passenger	139,745,259	133,636,406	82,418,867	81,132,795	20,398,185	18,931,767	36,928,207	33,571,844
Mail	37,679,473	37,666,694	14,478,066	14,642,469	6,723,524	6,647,821	16,477,883	16,376,404
Express	23,849,616	23,988,851	9,085,653	9,722,434	6,036,248	5,724,792	8,727,715	8,541,625
All other transportation	31,896,243	30,380,805	16,352,427	16,135,713	3,299,651	3,016,545	12,244,165	11,228,547
Incidental	26,277,468	24,385,000	14,217,376	13,464,450	4,336,552	3,900,583	7,723,540	7,019,967
Joint facility—Cr.	3,928,168	3,612,754	1,249,898	1,164,986	866,911	810,998	1,811,359	1,636,770
Joint facility—Dr.	1,054,574	915,275	292,221	250,446	84,560	76,799	677,793	588,030
Railway operating revenues	1,354,258,406	1,347,117,607	623,790,213	625,521,474	262,166,594	264,165,907	468,301,599	457,430,226
Expenses:								
Maintenance of way and structures	146,466,445	143,994,190	56,948,368	58,458,445	30,596,635	29,230,112	58,921,442	56,305,633
Maintenance of equipment†	277,396,033	272,708,000	124,613,690	125,937,650	53,084,887	51,000,079	99,697,456	95,770,271
Traffic	38,735,597	36,493,470	14,496,225	13,722,345	7,576,084	7,008,149	16,663,288	15,762,976
Transportation	510,869,351	480,172,887	238,284,526	230,440,052	87,187,656	81,392,555	185,397,169	168,340,280
Miscellaneous operations	12,193,848	10,627,894	5,778,381	5,340,280	1,703,357	1,430,612	4,712,110	3,857,002
General	58,429,303	60,886,426	27,288,427	26,704,383	10,470,080	10,334,142	20,670,796	23,847,901
Transportation for investment—Cr.	1,092,009	909,053	271,225	242,669	138,537	100,957	682,247	565,427
Railway operating expenses	1,042,998,568	1,003,973,814	467,138,392	460,360,486	190,480,162	180,294,692	385,380,014	363,318,636
Net revenue from railway operations	311,259,838	343,143,793	156,651,821	165,160,988	71,686,432	83,871,215	82,921,585	94,111,590
Railway tax accruals	101,451,246	105,585,328	41,621,848	43,189,524	21,523,832	21,632,120	38,305,566	40,763,684
Uncollectible railway revenues	389,274	485,938	151,774	262,654	59,462	78,229	178,038	145,055
Railway operating income	209,419,318	237,072,527	114,878,199	121,708,810	50,103,138	62,160,866	44,437,981	53,202,851
Equipment rents—Dr. balance	33,883,041	37,277,602	16,620,200	18,723,600	2,490,698	3,405,766	14,772,143	15,148,236
Joint facility rent—Dr. balance	14,748,308	14,965,657	8,460,819	8,289,063	1,487,519	1,815,132	4,799,970	4,861,462
Net railway operating income *b*	160,787,969	184,829,268	89,797,180	94,696,147	46,124,921	56,939,968	24,865,868	33,193,153
Ratio of expenses to revenues (per cent)	77.02	74.53	74.89	73.60	72.66	68.25	82.29	79.43
† Includes:								
Depreciation	79,716,720	77,636,505	34,699,221	34,174,261	15,479,535	14,680,370	29,537,964	28,781,874
Retirements	588,183	1,779,423	222,377	531,623	156,298	558,290	209,508	689,510
Maintenance of equipment before depreciation and retirements	197,091,130	193,292,072	89,692,092	91,231,766	37,449,054	35,761,419	69,949,984	66,298,887
Net railway operating income before depreciation and retirements	241,092,872	264,245,196	124,718,778	129,402,031	61,760,754	72,178,628	54,613,340	62,664,537

a The May, 1935, income as reported was increased by credits to operating expenses on account of reversal of charges previously made for liability under the Railroad Retirement Act. These credits amounted to $8,659,753.

b Income for the five months ended with May, 1935, as reported was increased by credits to operating expenses on account of reversal of charges previously made for liability under the Railroad Retirement Act. The net credit was $4,509,425.

d Deficit or other reverse items.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

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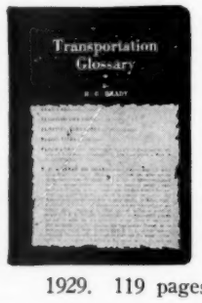

Technical and semi-technical terms, phrases and expressions in more common use in railway, highway, air and marine transportation, and in port traffic are concisely defined in this handy reference book. Ordinary dictionaries, thesauri and law book sources furnish little information on transportation terms and this book fills a long felt need. It is printed in large clear type and cross references facilitate quick tracing of desired information.

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